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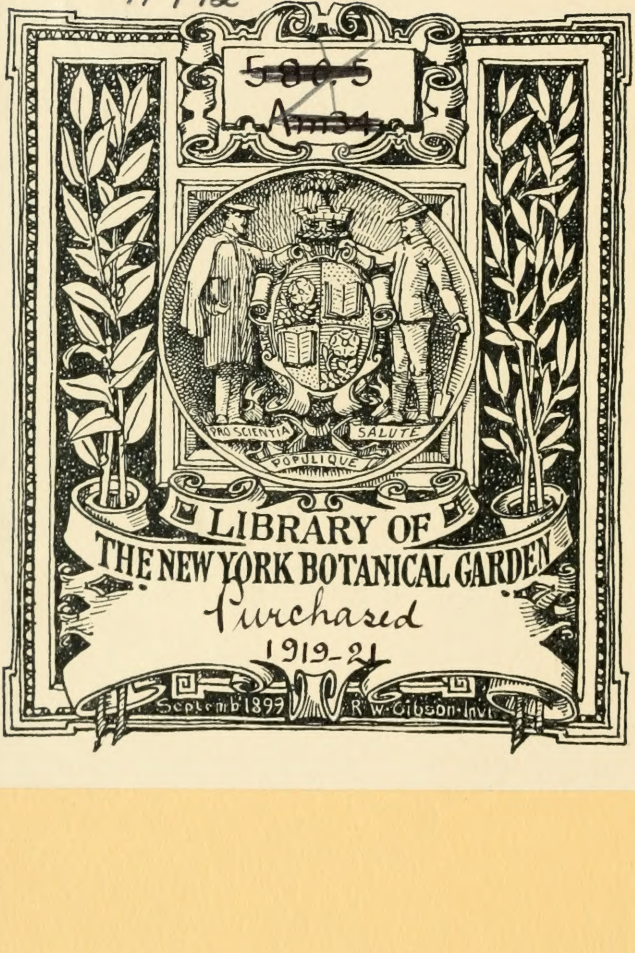

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THE AMERICAN BOTANIST

A QUARTERLY JOURNAL OF ECONOMIC AND
ECOLOGICAL BOTANY

EDITED BY WILLARD N. CLUTE

Volume XXV

JOLIET, ILL.
WILLARD N. CLUTE & CO.
1919

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v. 25-27

CONTENTS

ILLUSTRATED ARTICLES MARKED WITH A STAR (*).

A Little Known Botanist...........*James C. Nelson* 129
Alpine Primrose, The ....*Mrs. Blanche H. Soth* *121
Azaleta, The Western ....*S. L. Watkins*...51
Beeches, A Group of................*Adella Prescott* 5
Blooming of Portulaca........... *Nell McMurray* 133
Blueberries, Cultivated ....*H. E. Zimmerman*...*7
Botanic Gardens 101
Botanist, A Little Known...........*James C. Nelson* 129
Botany, Systematic ....*Chas. W. Bowles* *57
Catalina Island, A Botanical Trip to...*Geo. L. Moxley* 93
Color, Flowers of Varying..........*James C. Nelson* 96
Cushion Pink, The ....*Blanche H. Soth* *1
Desert Places Made to Bloom...... *Mrs. E. F. Rush* *125
Flowers of Varying Color..........*James C. Nelson* 96
Foxglove, A Freak.................*James C. Nelson* *88
Fragrant Wildflowers ....*C. L. Gruber* 8
Gentian, The Arctic............*Mrs. Blanche H. Soth* *41
Haunts of a Naturalist, The..............*H. Tullsen* 137
Lily, The Sand................*Earl Lynd Johnston* 52
Mangrove, The ....*Vaughan MacCaughey* 42
Money in Drug Plants, The.......*Willard N. Clute* 15
Navajo Mountain, A Trip to........*Willard N. Clute* *81
Officinal Drugs of the United States..*Willard N. Clute* 47
Phlox Nomenclature ....*Willard N. Clute* *100
Plant Names and their Meanings.... *Willard N. Clute* 122
Potato Wart Disease, The......................... *95
Roselle, The ....*W. M. Buswell* *14
Rumex, The Gender of............*James C. Nelson* 55
Systematic Botany ....*Chas. W. Bowles* *57
Wildflowers of Florida, Familiar......*W. M. Buswell* 90
The Name Toxylon Again..........*James C. Nelson* 21

Tomato Grafted on Potato........*H. E. Zimmerman* *145
Useful Plants, Additional Notes on................ 64
Vinegar Bees ....*Willard N. Clute* 2
Editorial............................34, 72, 114, 156
Books and Writers........................36, 74, 115

NOTE AND COMMENT

Age and Protoplasm..........106
Algae Migrations 28
Apios tuberosa, Fruiting of...154
Blueberries, High Priced......108
Bobolinks under the Ban.....107
Butterfly Pea, Spurred........112
Calypso Variations in..........152
Chenopodiums, Oregon 112
Chestnut, Resistant 25
Conopholis, Rarity of....107, 151
Cucumber, Wild, Flowering of 152
Cucumber, Wild, Germination of.......................... 66
Dandelions in January........ 30
Day Flower, The............. 30
Diamond Flower in Oregon.. 65
Drug Plants, Additional.......111
Ebony Spleenworts, Large.... 69
Elder Blossoms 66
Floras, Dwarf Shore.......... 31
Forests, Our Depleted........155
Fragrance of Camassia........146
Fragrant Wildflowers 109
German Irises 147
Hepatica, Flowers of..........148
Houseleeks, Hardy 68
Irises, German 147
Kochia alata 110
Laurel Philology 24
Live-for-ever Blooming 111
Locust, Black Use of.......... 24
Meadow Parsnip, Stamens of.. 69
Name of Plant Wanted......148
Name Tinkers Ever with Us.. 67
Peloria 148
Pennyroyal of Europe........ 67
Plant Embargo, A............ 30
Poison Ivy, Cure for.........149
Protoplasm, Age and..........106
Puddling the Soil............. 27
Quarrantine 37, 153
Rarity of Conopholis......107, 151
Shrubs, Valuable new.......... 29
Species Conception, The...... 26
Species East and West........ 70
Stamens of Meadow Parsnip.. 69
Sugar 146
Sugar, Sweeter than........... 32
Swamp Apples 109
Trailing Arbutus Bush........ 27
Transpiration 33
Vinegar Bees 108
Wildflowers, Fragrant 109

Vol. 25. No. 1 Whole Number 120

THE
AMERICAN BOTANIST

FEBRUARY, 1919

35 Cents a Copy; $1.25 a Year

WILLARD N. CLUTE & CO.
JOLIET, ILLINOIS

The American Botanist

A Quarterly Journal of Economic & Ecological Botany

WILLARD N. CLUTE, EDITOR

SUBSCRIPTIONS.—The subscription price of this magazine is $1.25 a year or $2.00 for two years, payable strictly in advance. The magazine is not sent after subscriptions expire. Personal checks on small or distant banks must contain ten cents for collection fees. The magazine is issued on the 20th of February, May, August and November.

BACK NUMBERS.—Volumes 1 to 10 inclusive consists of 6 numbers each, Vols. 11 to 13 of 5 numbers each and all later volumes of 4 numbers each. The first 18 volumes may be had for 75 cents a volume, or the set will be sent for $9.00. The next 4 volumes $1.00 each or the set for $3.25. A full set contains 2968 pages.

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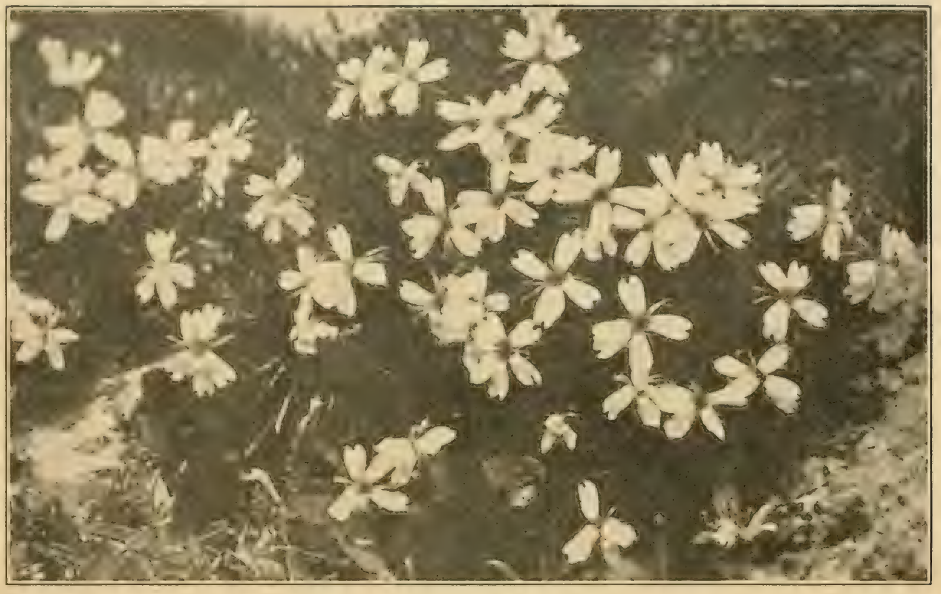

CUSHION PINK—*Silene acaulis.*

THE AMERICAN BOTANIST

VOL. XXV. FEBRUARY 1919. No. 1.

The seasons come, the seasons go,
Bright autumn fades to winter drear,
But flitting light above the snow
The bluebird warbles "Spring is near."

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THE CUSHION PINK

BY MRS. BLANCHE H. SOTH.

MOSS campion is another name for this characteristic matted plant of the alpine zone, *Silene acaulis*. The stems, with their numerous tiny pointed leaves, interlace and form dense, dark green tufts that are firmly fastened in the loose gravelly soil by their long, strong tap-roots. The flowers vary in color, from pink and rose or purple to almost white. They occur singly and are set close down among the leaves, so that they look like stars "spangling a cushion green, like moss."

The plant is abundant upon the high mountains of Europe as well as upon those of our own country. It is a true "Arctic-alpine" plant abounding on the Arctic continent and islands almost to the extreme northern limit of vegetation. In these far northern latitudes it grows at sea level, so that we know it is not altitude that makes plants small and matted. Such plants grow upon the high peaks because their nature permits them to exist under the trying conditions that prevail there. Poor soil, fierce winds, long dry and cold seasons and sudden and extreme changes of temperature have no terrors for the dainty little cushion pink.

VINEGAR BEES

By Willard N. Clute.

"YOU take two tablespoonfuls of sugar, two tablespoonfuls of molasses, two quarts of water and one cup of vinegar bees; set the mixture in a warm place and in three days, it will turn to vinegar." This is the formula that has been handed about recently from one housewife to another, accompanied by a cupful of the bees in question, for not only do the bees deliver the vinegar according to schedule, but in doing so double their numbers and thus make it possible to pass along a good thing without trouble or expense.

In appearance, vinegar bees are anything but beelike. They resemble nothing so much as chunks of suet about as big as the end of the little finger. When one sees them at work, however, the derivation of the name is clear, for they are constantly rising and sinking through the liquid with a buzzing effervescence that reminds one of a swarm of bees. Under the microscope the bees are resolved into at least three kinds of plants: oval yeast cells, minute round bacteria and certain white thready growths that give the appearance of suet noted.

The bees appear to be an entirely new thing to botanists; at least those we questioned, had no explanation ready. Finally we wrote to Dr. John W. Harshberger, whose excellent volume on Mycology was recently reviewed in these columns. Here, we said, we will get an answer if there is one and we were not mistaken. Dr. Harshberger writes as follows:

"I think you must have in mind, the ginger beer plant. In England the preparation of the foaming acid beverage which is kept in brown stone jugs, is a very simple matter. To a 10-20 per cent solution of sugar are added a few pieces of ginger and a couple of granules of the ginger beer plant, the whole being left to stand uncovered. The liquid soon begins to ferment very briskly, is bottled at the end of twenty-four hours and consumed within the next two days. The so-called ginger beer plant, was studied by H. M. Ward (Philosophical Transactions 1892: 125 with 6 plates; Proc. of the Royal Soc. 1892.) It consists of whitish or brownish translucent lumps and is the mixture of a yeast (*Saccharomyces pyriformis*) and a fission fungus (*Bacterium vermiforme.*) The cell walls of the latter become gelatinized, the sheath being frequently ten times greater than the diameter of the cell. It stands in symbiotic relations with the *Saccharomyces pyriformis,* so that the development of one is facilitated by the presence of the other. The lumps of the plant are kept in a state of saltatory motion by the liberated carbon dioxide. The chief products of the fermentation are carbon dioxide, lactic acid, alcohol and acetic acid. You will find a short reference to it in my book on page 140, also in *Garden and Forest* VI. 50."

It will be seen from the foregoing, that vinegar bees are essentially like lichens, in that two different plants have formed a partnership that is mutually helpful. In the making of ordinary vinegar, both yeast and bacteria are necessary. The yeast splits the sugars and starches into carbon dioxide and alcohol and the bacteria finish the job by splitting alcohol into acetic acid, that is, the sour of vinegar. In the vinegar bee plant or partnership, the work of splitting sugar and alcohol, can procede side by side and thus the rapid production of vinegar is accounted for.

The vinegar produced is to all appearances good vinegar, though it lacks some of the bouquet possessed by vinegars made from fruit juices, owing to the lack of the essential oils which they contain. The bee vinegar is not quite as strong as other vinegar owing to the small amount of sugar, the plants have to work with. The strength, however, could probably be increased by boiling down the fluid, or, better still, in winter by freezing, removing the ice and thus obtaining the vinegar.

How to preserve the bees for future use after they have produced enough vinegar to fill all the receptacles in the house, does not seem to be known. One does not care to keep them constantly on the job, as one does their animal prototypes. They are rather too busy to be satisfactory. Probably they can be dried and soaked up when wanted, but only experiment will show whether this suggestion is correct.

Although little known in this country until recently, their fame as well as the bees themselves is spreading rapidly. A certain amount of folk-lore has already been woven about them. One report has it, that the Government has distributed the bees to aid in reducing the high cost of living. In the light of recent events, we might suspect the brewers of having a hand in the matter. Ginger beer sounds suggestive. Another story is to the effect that two partners in the vinegar business quarreled and one gave away a trade secret to spite the other. Whether we accept these stories or make new ones up for ourselves, the fact remains, that this is a most interesting plant partnership and one that deserves further investigation.

Various other combinations of yeasts and bacteria have been discovered, but they are seldom mentioned in print. One of the more famous is that called kefir or kephir grains, which consists of *Saccharomyces cartilaginosus* and *S. fragilis* and three species of bacteria, the most important being *Bacillus Caucasicus*. This is used to ferment milk in the Caucasus region. Matzoon is a drink made in Armenia, by adding a similar colony of yeasts, fungi and bacteria, containing seven different organisms.

A GROUP OF BEECHES

By Adella Prescott.

IT was on a bleak winter day that I first made the acquaintance of my beeches. I say "My beeches" but they are mine only by right of discovery; another owns the ground on which they stand, but even so, I have the best of it, for I doubt if the owner of the ground has ever really seen the trees, though he must have passed them many times, while for me even the thought of them is a delight.

On this particular day I had quite definitely made up my mind that life was not worth living, for hepaticas seemed very far away and even strawberries were only a vague memory. The world seemed in a very chaotic condition and while I did not for a moment suppose that figs would ever grow on thistles it seemed quite believable that the reverse might occur. But after I found the beeches and had listened for awhile to the cheerful rustle of their crisp brown leaves as they talked of the failures and successes of the last season and laid their plans for the next, I went home and with florist's catalogues all about me I made a list of all the things I wanted, even though I knew I could not get them and had no place to put them if I could.

These beeches are not by any means fine specimens of their kind, for they grow on the side of a steep bank, where they have scanty nourishment and a precarious foothold. There are fifteen or twenty of them varying in size from slender saplings to one or two eight or ten inches in diameter. I have never seen nuts on them and fancy that up to the present time they have had quite enough to do to secure their own livelihood, without making any effort to perpetuate their species.

But in spite of their unfavorable surroundings, they possess a large measure of the peculiar charm of the beeches and the steepness of the bank has done them one good turn at least —it has saved part of them from the vandalism of youthful lovers, who never seem to find their happiness quite complete until their initials, enclosed, perhaps, in the outline of a heart, are carved on the bark of a beech tree. I think no other tree of our north-land with the possible exception of the birch, can compare in beauty of bark with the common beech. It is a peculiarly smooth, firm looking bark of a soft light gray color, mottled with a darker gray that seems like the shadows of the leaves caught and fixed by some magic alchemy. It is small wonder that the boy with a sharp knife in his pocket and a wonderful name in his heart, fails to resist the temptation to test the one and perpetuate the other on this most alluring of surfaces.

Everything about the beech tree is attractive. The slim, polished brown buds are distinctive and elegant, the half unfolded leaves with their deep veins and creases are exquisitely soft and dainty in appearance and the mature leaves are pleasing in form and color. In the autumn they change through shades of greenish yellow to shining gold which later becomes a russet brown and a large part of the leaves cling to the twigs until late in the winter. Although this particular group of trees have never given me any nuts, yet other trees in other fields have given me many a delicious feast. The little three-cornered nuts have a flavor all their own and are so small that one cannot eat them too rapidly if he would—at least not unless he shells a quantity before he begins to eat.

Beechnuts are a favorite food of chipmunks and squirrels and the Nature lover who has spent a golden October afternoon under a beech tree, sharing the nuts with the saucy creatures who scold him soundly if they suspect him of taking more than his share, can have no quarrel with Fate even if November days are dark and drear.

CULTIVATED BLUEBERRIES

By H. E. Zimmerman.

As a result of the experiments of the Department of Agriculture with blueberries, sometimes called huckleberries, or whortleberries, it is quite probable that they will eventually be cultivated in the United States as extesively and as profitably as cranberries are cultivated now. Already there are blueberry plantations so successful, that their owners plan to enlarge them. One in Indiana was started in 1889, in a natural blueberry bog that was first drained and then set with wild blueberry bushes, without selection for individual productiveness or size of berries. On that plantation, the average yield has been 1741 quarts an acre for the last six years and would have been still higher except for the almost total failure of the crop in 1910, because of late spring frosts. The berries brought an average price of fourteen and one-half cents a quart. Allowing for interest, taxes and depreciation, the annual profit is reckoned at $116 an acre. Agricultural experts recommend that the most promising wild bushes be selected for size, flavor, color and early ripening and then be transplanted. The aim is to produce wild berries that are easy to pick and that sell for a higher price than the smaller ones. Berries 11-16 of an inch in diameter, are not uncommon now. Blueberries thrive best in soils so acid as to be considered worthless for ordinary agricultural purposes. Raising them, therefore, promises to add to the general welfare through the utilization of otherwise valueless land.

FRAGRANT WILDFLOWERS

By C. L. Gruber.

DURING 1917 I tested the fragrance of about 250 species of flowers and the following list comprises those species which I found fragrant to a greater or less degree. The omission of species known to be fragrant, simply means that I did not have the opportunity to test them during the season of 1917. In the appended list:

(a) Means very fragrant, (b) means fragrant and (c) means slightly fragrant. (a-b) means usually very fragrant, but sometimes only fragrant, while (b-a) means usually fragrant, but sometimes very fragrant: similarly for (b-c) and (c-b.)

The following obesrvation may not be out of place:

1. Flowers must not be too old to test their fragrance.

2. The test of fragrance lies, not in one flower, but in a mass. This is more particularly true of small flowers.

3. Very commonly, flowers of the same species growing in shade, are not so fragrant as those growing in open sunlight.

4. Most flowers seem to lose fragrance when plucked and withering, but a few species appear to be more fragrant under this condition.

5. The fragrance of some flowers is worth noting, even if it is only slight, because of quality or peculiarity.

List of Species Tested.

Uvularia perfoliata. Bellwort. Yellow. b-a.

Muscari botryoides. Grape Hyacinth. Blue. b-c

Vagnera racemosa. Wild Spikenard. White. b.

Unifolium Canadense. Two-leaved Solomon's Seal. White. b-a.

Convallaria majalis. Lily of the Valley. White. b-a

Hypoxis hirsuta. Star-grass. Yellow. c.

Iris versicolor. Blue Flag. Blue. b.

Sisyrinchium angustifolium. Blue-eyed Grass. Blue b-c.

Cypripedium acaule. Ladies Slipper. Pink-red. b.

Camptania peregrina. Sweet Fern. Brownish-green. b.

Castanea dentata. Chestnut. Whitish. a.

Salix discolor. Willow. Yellow. c.

Polygonum Pennsylvanicum. Persicaria. Pink. c-b.

Claytonia Virginica. Spring Beauty. Pink. b.

Saponaria officinalis. Bouncing Bet. Light rose. b-c.

Dianthus barbatus. Sweet William. Red. a.

Castalia odorata. White Water Lily. White. a.

Liriodendron Tulipifera. Tulip Tree. Yellow. c.

Hellebōrus viridis. Green Hellebore. Yellowish green. b.

Anemone Virginiana. Anemone. Whitish. c-b.
Hepatica triloba. Liver-leaf. Blue. b-c.
Clematis Virginiana. Virgin's Bower. White. b-a.
Ranunculus repens. Buttercup. Yellow. c.
Benzoin aestivale. Spice-bush. Yellow. c-b.
Chelidonium majus. Celandine. Yellow. c-b.
Lepidium Draba. Hoary Cress. Whitish. b.
Brassica arvensis. Wild Mustard. Yellow. b-c.
Saxifraga Virginiensis. Early Saxifrage. White. c.
Rubus Canadensis. Dewberry. White. c.
Fragaria Virginiana. Wild Strawberry. White. b.
Rosa canina. Dog Rose. Bright rose. b.
Rosa humilis. Low wild rose. Rose. b.
Rosa Carolina. Swamp Rose. Rose. b.
Rosa rubiginosa. Sweetbrier. Light rose. b.
Malus coronaria. American Crab Apple. Rose. a.
Pyrus communis. Pear. White. b-c.
Malus Malus. Apple. Pink, white or rose. b.
Aronia nigra. Chokeberry. White. b.
Amelanchier Canadensis. Juneberry. White. c-b.
Crataegus punctata and related species and forms. a.
Crataegus tomentosa and related forms. b.
Prunus Americana. Wild Plum. White. b.
Prunus Avium. Cerry. White. b-a.
Prunus Cerasus. Sour Cherry. White. b.
Prunus serotina. Wild Black Cherry. White. b.
Amygdalus Persica. Peach. Pink or rose. b-c.
Cassia Marylandica. American Senna. Yellow. c-b.
Baptisia tinctoria. Wild Indigo. Yellow. c.
Melilotus officinalis. Melilot. Yellow. b-a.
Trifolium agrarium. Hop-clover. Yellow. c.
Trifolium arvense. Rabbit-foot Clover. Pale purple. b.
Trifolium pratense. Red Clover. Red. b.
Trifolium repens. White Clover. White. b.
Robinia Pseudacacia. Locust. White. a.
Apios tuberosa. Ground-nut. Brown purple. a.

Ailanthus glandulosa. TREE OF HEAVEN. Yellowish green. b. (Ill-smelling to some noses.)

Rhus glabra. SMOOTH SUMAC. Greenish yellow. b.

Rhus radicans. POISON IVY. Greenish white. b-c.

Acer rubrum. RED MAPLE. Red or reddish yellow. b-c.

Acer platanoides. NORWAY MAPLE. Yellow. c-b.

Ceanothus Americanus. NEW JERSEY TEA.. White. b-c.

Vitis aestivalis. SUMMER GRAPE. Whitish. a.

Tilia Americana. LINDEN. Dull Yellow. a.

Hypericum perforatum. COMMON ST. JOHN'S-WORT. Yellow. c-b.

Hypericum maculatum. SPOTTED ST. JOHN'S-WORT. Yellow. b-c.

Viola pedata. BIRD'S-FOOT VIOLET. Lilac. c.

Viola lanceolata. LANCE-LEAVED VIOLET. Blue. c-b.

Viola blanda. SWEET WHITE VIOLET. White. b.

Viola odorata. MARCH VIOLET. Blue. b-c.

Onagra biennis. EVENING PRIMROSE. Yellow. c-b.

Daucus Carota. WILD CARROT. White. b.

Pimpinella integerrima. YELLOW PIMPERNEL. Yellow. b.

Pastinaca sativa. WILD PARSNIP. Yellowish. c-b.

Cicuta maculata. MUSQUASH ROOT. White. c-b.

Cornus florida. FLOWERING DOGWOOD. White and yellow. b.

Cornus Amonum. KINNIKINNIK. White. b.

Cornus alternifolia. ALTERNATE-LEAVED DOGWOOD. Whitish. c-b.

Chimaphila maculata. SPOTTED WINTERGREEN. White. b.

Azalea nudiflora. PINK AZALEA. Pink. b-a.

Epigaea repens. TRAILING ARBUTUS. Rose. b-a.

Vaccinium stamineum. DEERBERRY. Whitish. c-b.

Lysimachia Nummularia. MONEYWORT. Yellow. b-a.

Syringa vulgaris. LILAC. Lilac. a.

Ligustrum vulgare. PRIVET. White. b.

Apocynum androsaemifolium. SPREADING DOGBANE. Pinkish. b.

Apocynum cannabinum. INDIAN HEMP. Whitish. b.

Asclepias incarnata. SWAMP MILKWEED. Red-pink. b.

Asclepias exaltata. POKE MILKWEED. Whitish. c-b.

Asclepias Syriaca. COMMON MILKWEED. Pink-purplish. a.

Asclepias quadrifolia. FOUR-LEAVED MILKWEED. Pale purplish. b-a.

Collinsonia Canadensis. HORSE-BALM. Yellow. a.

Physalis pubescens. GROUND-CHERRY. Yellow, dark eye. b-c.

Petunia violacea. PETUNIA. Purplish. b-a.

Verbascum Thapsus. MULLEIN. Yellow. b.

Linaria vulgaris. TOAD-FLAX. Yellow. b.

Dasystoma Pedicularis. FERN-LEAVED FALSE FOXGLOVE. Yellow. b.

Sambucus Canadensis. ELDER. White. b.

Viburnum prunifolium. BLACK HAW. White. b.

Viburnum dentatum. ARROWWOOD. White. b.

Viburnum acerifolium. DOCKMACKIE. White. b.

Lonicera Japonica. JAPANESE HONEYSUCKLE. White and pink. a.

Cichorium Intybus. CHICORY. Blue. b.

Taraxacum officinale and *erythrospermum.* DANDELION. Yellow. c-b.

Sonchus oleraceus. SOW-THISTLE. Yellow. c.

Vernonia Noveboracensis. IRONWEED. Purple. c-b.

Eupatorium purpureum. JOE-PYE WEED. Pinkish. b-c.

Eupatorium perfoliatum. THOROUGHWORT. White. c-b.

Solidago juncea. GOLDEN-ROD. Yellow. c-b.

Solidago serotina. GOLDEN-ROD. Yellow. b.

Euthamia graminifolia. FRAGRANT GOLDEN-ROD. Yellow. b-a.

Erigeron Philadelphicus and *annuus.* FLEABANE. White. b-c.

Anaphalis margaritacea. PEARLY EVERLASTING. White. b.

Rudbeckia hirta. CONE-FLOWER. Yellow, dark center. c.

Achillea millefolium. MILFOIL. White. b-c.

Anthemis arvensis. FIELD MAYWEED. White, yellow center. b-c.

Anthemis Cotula. COMMON MAYWEED. White, yellow center. b.

Tanacetum vulgare. TANSY. Yellow. b-c.

Senecio aureus. GOLDEN RAGWORT. Yellow. c-b.

Carduus arvensis. CANADA THISTLE. Pink-purple. b.

Carduus odoratus. PASTURE THISTLE. Deep pink. a-b.

Carduus lanceolatus. COMMON THISTLE. Light purple. b.

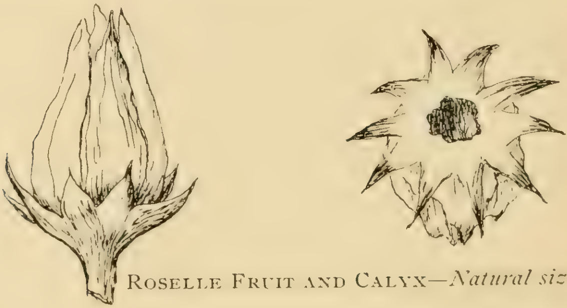
Carduus discolor. FIELD THISTLE. Light purple. b.

Centaurea nigra. BLACK KNAPWEED. Rose-purple. c-b.

THE ROSELLE

By W. M. Buswell.

WHILE walking along the street in the city of Tampa just before Thanksgiving, I noticed some odd looking things in a box in front of a grocery store. Curious to know what sort of fruit or vegetable they could be, I asked the groceryman, who told me that they were "Florida cranberries."



Roselle Fruit and Calyx—*Natural size*

"Cranberries," I said, "surely you don't call those things cranberries." "Yes, they are Florida cranberries. I could not get the other kind, so I got some of these. Some of the farmers grow them and you can scarcely tell the difference when made into sauce or jelly."

The grocer did not seem to know of any other name for them, but later I saw them in another place labelled Roselle. That, I thought is probably the real name, so at the first opportunity I looked it up. This is what I found. "Roselle or Jamaica sorrel. Cultivated in the Tropics where the true cranberry does not grow. Used as a substitute for this fruit in the making of jellies, sauces and marmalades. It is said to be slightly less acid than the cranberry, but otherwise the flavor is much the same."

The so-called Florida cranberries look like large red flower buds. The whole outer part is used, the inner green seed pod not being edible. The plant resembles a cotton plant and the dark-red cone-shaped fruits grow in the axils of the leaves. The scientific name of the plant is *Hibiscus sabdariffa*.

THE MONEY IN DRUG PLANTS

By Willard N. Clute.

IT seems to be the general impression, that collecting and cultivating drug plants for market, offers a short cut to fortune and a variety of circumstances serves to deepen this impression. The price of ginseng has long lingered in the vicinity of the eight dollar level, heroes of popular fiction find they have the touch that will transform common plants into gold and the dispensor of drugs helps the idea along by charges quite in keeping with the popular understanding.

It is possible, however, that some of these values are fictitious. The ginseng craze of some years ago, like the tulip craze in Holland and the mulberry craze in the early days of our own country, finally passed without developing any great number of millionaires. The virtues of ginseng lie, not in the diseases it will cure, but in the diseases the Chinese believe it will cure and so, like good Americans, we encourage the delusion so long as it is a paying one. Nor can we form a proper estimate of the value of drugs by the prices charged when the pharmacist sells them back to us. In his charges, the drug dispensor includes a fee for knowing what to use and another for knowing how to decipher those interesting hieroglyphics that invariably follow a capital R with a pin through its tail. It may be well, therefore, to spend a few moments investigating this gold mine in the back yard and discovering, if possible, just how much it assays to the ton and whether there is anything in the cultivation of drug plants for one who otherwise might become a plumber or enter some other line of profiteering.

The properties that give plants their medicinal value, are widely distributed in nature. Certain kinds, however, are in special favor because they contain a greater amount of the desired principle, or because they yield it with less labor. Many plants, therefore, are not in demand, simply because better kinds are in the market. Those upon which the physician and pharmacist have set their approval, are known as "official drugs." Of this class, less than a hundred from the United States, have been admitted into that official "Who's Who" among drug plants the United States Pharmacopeia. Several hundred others not so included, are used in the manufacture of oils, dyes, tannins and similar substances employed in the arts. It is likely that all the plants used for such purposes would number nearly 3,000 species.

Several things combine to reduce the return that might be expected from the growing of drug plants. For one thing, a large number of the most useful, are inhabitants of the warmer parts of the earth and cannot be grown here at all. Others grow in Europe as well as in America and are collected and marketed in the Old World at prices that would not attract even the ashman and the garbage collector here. Of our native plants, those that are abundant in the wild state, are usually collected by children and others who are satisfied with a small return for the spare time spent in the work. Finally, drugs are not used like foods. They are prescribed in ever decreasing quantities and a little goes a long way. Belladonna is a well known and frequently used drug and yet the amount that can be produced on a single acre would supply a million people with all this drug they would need in a year.

An inspection of the prices of drug plants appended to this article, will show few that offer more than a very moderate return for the time spent in collecting them from the wild and this return would be further reduced, if one were to attempt their cultivation, for then the cost of the land and its preparation, as well as the seed, would have to be included. Moreover, the prices given are the highest retail prices in a war year and the wholesaler under normal conditions, would offer much less—perhaps only half as much. It should be remembered, also, that before the plants are ready for market, they must be dug, washed, peeled, sliced, dried and otherwise prepared and the care with which this is done, greatly affects the salability of the plants. One must also allow for the expenses of packing, transporation and various incidentals and above all, must know the best time for collecting each kind and where to sell it.

Whenever the price of a drug appears sufficiently high to make its collection or cultivation worth while, there is usually some other obstacle in our pathway to sudden wealth. Saffron for instance, is quoted at $14.00 a pound, but saffron is made from the stigmas of a species of crocus and after one had rifled some thousands of flowers for enough of the tiny stigmas, to make a pound, he would discover that he had fully earned his $14.00. Pure oil of wintergreen is worth $5.20 a pound. An oil exactly like it, from the black birch, brings $3.30 a pound, while the synthetical oil that cannot be distinguished from the others is quoted at $1.35 a pound. The price of hydrastis is high and is likely to remain so for a long time, but the plant is scarce in the wild and also very difficult to cultivate. It requires three years to come to maturity from seed, but is reported to yield 1500 pounds of the rhizomes to the acre and thus offers some hopes of success for those who can induce it to grow.

Those who purpose taking up the cultivation of drug plants, are advised to go slow at first and to attempt only one kind at a time. Other plants can be taken on as one's knowledge increases. Frequently the land must be selected with reference to its suitability to the crop to be grown and it is also well to have a market in view before investing too heavily in the enterprise. For one who has the leisure, collecting some of the wild plants listed, might present some attractive features. In that case he would do well to learn in advance, the price he could expect and the chance of marketing his product.

The plants in the following list are those of the Pharmacopeia. The scientific and common names are given, the parts used indicated and the price, when possible, quoted. At another time it is proposed to list our native medicinal plants that are not official. For aid in preparing this article, I am greatly indebted to Prof. O. A. Farwell of Detroit.

Official Drugs of the United States.

Aristolochia serpentaria. Virginia snakeroot. Rhizome, 55c.

Anemone pulsatilla. Pasque flower. Herb, 50c

Arctium Lappa. Burdock. Seeds and Roots, 34c, 44c.

Artemisia absinthianum. Wormwood. Leaves and tops, 70c.

Aconitum napellus. Aconite. Leaves and roots 35c, 70c.

Acorus calamus. Sweet Flag. Rhizome, 30c.

Althaea officinalis. Marshmallow. Root, 63c.

Apocynum cannabinum. Indian Hemp. Root, 42c.

Arnica montana. Arnica. Roots and flowers. $2.25.

Asclepias tuberosa. PLEURISY ROOT. Root, 55c

Atropa belladonna. BELLADONNA. Leaves, root, $2.60, $5.00

Calendula officinalis. MARIGOLD. Herb.

Caulophyllum thalictroides. BLUE COHOSH. Rhizone,

Castanea dentata. CHESTNUT. Leaves, 23c.

Chelidonium majus. CELADINE. Whole plant.

Chenopodium ambrosioides and *C. anthelminticum.* WORMSEED. Plant, 22c.

Chimaphila umbellata. PIPSISSEWA. Leaves.

Cimicifuga recemosa. BLACK SNAKEROOT. Rhizome. 20c.

Conium maculatum. HEMLOCK. Seeds.

Convallaria majalis. LILY OF THE VALLEY. Rhizome.

Cypripedium pubescens. LADY'S SLIPPER. Root, 47c.

Daphne mezereon. MEZEREON. Bark, 60c.

Eriodictyon glutinosa. YERBA SANTA. Plant, 50c.

Euonymus atropurpureus. WAHOO. Bark, 60c.

Eupatorium perfoliatum. BONESET. Leaves, 55c.

Gelsemium sempervirens. YELLOW JASMINE. Root, 25c.

Gentiana lutea. YELLOW GENTIAN. Root, 25c.

Geranium maculatum. CRANE'S BILL. Root.

Gossypium herbaceum. COTTON. Root.

Grindelia robusta. GRINDELIA. Leaves, 30c.

Hamamelis Virginiana. WITCH HAZEL. Leaves and bark, 27c.

Hedeoma pulegioides. PENNEYROYAL. Leaves, 35c.

Hydrastis Canadensis. GOLDEN SEAL. Rhizome, $7.50.

Inula helenium. ELECAMPANE. Root, 20c.

Iris versicolor. BLUE FLAG. Rhizome.

Juglans cinera. BUTTERNUT. Bark of root.

Leptandra Virginica. CULVER'S ROOT. Root, 30c.

Lobelia inflata. LOBELIA. Leaves, 40c.

Lycopodium clavatum. CLUB MOSS. Spores, $2.30.

Menispermum Canadense. Moonseed. Rhizome.

Nephrodium filix-mas. Male Fern. Rhizome, 60c.

Erigeron Canadense. Fleabane. Leaves.

Gaultheria procumbens. Wintergreen. Oil from leaves.

Podophyllum peltatum. May-apple. Rhizome, 20c.

Prinus verticillata. Winterberry. Bark.

Prunus serotina. Wild cherry. Bark, 16c.

Rhamnus purshiana. Cascara segrada. Bark, 25c.

Rhus toxicodendron. Poison ivy. Leaves.

Rhus glabra. Smooth sumach. Berries, 25c.

Rubus villosus. Blackberry. Root and leaves, 25c.

Rubus idaeus. Red raspberry. Leaves.

Rumex crispus. Yellow dock. Root, 22c.

Sambucus Canadensis. Elder. Flowers and berries,

Sanguinaria Canadensis. Bloodroot. Rhizome, 30c.

Sassafras officinale. Bark of root. Pith, 20c. 20c.

Scutellaria lateriflora. Scull-cap. Plant, 40c.

Solanum dulcamara. Bittersweet. Twigs, 30c.

Polygala Senega. Seneca snakeroot. Rhizome, $1.15.

Spigelia Marilandica. Pink root. Root, 75c.

Stillingia sylvatica. Queen's root. Root, 30c.

Tanacetum vulgare. Tansy. Leaves, 35c.

Datura stramonium. Jinson weed. Leaves, 30c.

Taraxicum dens-leonis. Dandelions. Root, 55c.

Arctostaphyllos uva-ursa. Bearberry. Leaves, 18c.

Valeriana officinalis. Valerian. Rhizome.

Viburnum prunifolium. Black Haw. Bark, 60c.

Viburnum opulus. Cramp bark. Bark, 60c.

Veratrum viride. Hellebore. Rhizome.

Zanthoxylum Americanum. Prickly ash. Berries and bark, 30c.

Phytolacca decandra. Poke. Root and berries, 22c,

THE NAME TOXYLON AGAIN

By J. C. Nelson.

At the risk of being consigned by the editor to realms of extreme and perpetual xerophytism, I find myself unable to refrain from pointing out to Dr. Everard, that in his well-meant attempt to lift my feet from the nomenclatorial slough into which they had unwittingly strayed, he has himself exemplified the editor's warning, that the most skillful player may sometimes slip into the mire. To assert dogmatically that "the scientific name for osage orange is *Toxylon pomiferum Raf.*" is simply to ignore the fact that there are still a few benighted systematists, who prefer to abide by the International Code, according to which *Maclura* is one of the "nomina conservanda"—and a better instance of the wisdom of retaining such a list could hardly be found. Secondly, his assertion that "the term *Toxylon* was applied by Rafinesque in the *American Monthly Magazine* in the year 1817, vol. 2, p. 118" is just as inaccurate as my attribution of the genius to Sargent. If Dr. Everard will look up this citation, he will find printed, not *Toxylon,* but *Ioxylon.* The article is headed, "Description of the Ioxylon Pomeferum, a new genius of North American Tree", and in the second sentence one reads: "I have been able to ascertain that it belongs to a new genus which I have called Ioxylon in my Florula Missurica [which never appeared.] This name means Arrowwood in Greek" This, it may be said in passing, was a perfectly legitimate derivation—as might have been expected from one whose mother-tongue was the modern Greek.

In his "Florula Ludoviciana," which appeared at a later date in 1817, he reviews his first article and repeats the name

Ioxylon. Nuttall published the species as *Maclura aurantiaca* in 1818 (Gen. II. 233,) to which Rafinesque objected in 1819 (Jour. de Phys. 260,) and this time spelled it *Joxylon.* The whole matter then remained in abeyance until 1830, when Rafinesque published in his "Medical Flora" (II, 268-69) a descriptive paragraph in his well-known harum-scarum style, in which he calls the species *Toxylon aurantiacum*, thus taking up Nuttall's specific name, but with no explanation of the changed spelling of the generic member. Finally, in his "New Flora," (III, 42) which did not appear till 1836, he writes as follows: "Toxylon Raf. 1817 in Mus. Nat. Sc. misprinted Ioxylon (an I for a T). Corrected in Medical Flora vol. ii page 268"; and after a page or so of rambling description he goes on to say: "My name means Bow-wood (Ioxilon would have meant arrowwood)—I made two oversights in my first account of this valuable tree in 1817, calling the leaves serrate and wood used for arrows." This time he calls it *Toxylon maclura* and cites *T pomiferum* Raf. 1817 as a synonym—which would of course not constitute valid publication for the latter binomial even had he meant to give it this name in the first place. As a matter of fact, the combination *Toxylon pomiferum* was given valid publication for the first time by Sargent in his Silva, VII. 89 (1895.)

It seems clear from these citations from the New Flora, that Rafinesque finally became dissatisfied with his original name, because it was based on a misconception of the use of the wood and after thirteen years of more or less watchful waiting, decided to change it to one more appropriate. Had he simply been trying to correct a printer's error, this change might have been accepted as legitimate; but both the Codes are very explicit in regard to changes for any other reason. The International Code (Art. 57) reads: "The original spelling of a name must be retained, except in case of a typographic or orthographic error"; and the American Code (Part III Sec. I. 1) is equally clear: "The original orthography of names is to be maintained, except in the following cases (a) Manifest typographical errors may be corrected, etc.

Since therefore the change which Rafinesque attempted to make involved more than the mere correction of a printer's error, it could not under either Code invalidate the earliest published name and those who adhere to the American Code would under their own rules have to call the species *Ioxylon pomiferum* Raf. Fortunately those of us who accept a code ratified by international agreement are released from all embarrassment in the matter by the retention among the *nomina conservanda* of Nuttall's name *Maclura,* to which of course *pomifera* as the earliest published specific name ought to be joined.

It was an error on my part to ascribe the name *Toxylon* to Sargent in such a way as to imply that he was the first to *invent* the word, although he was undoubtedly the first author to use it in a valid way in combination. Dr. Everard is equally wrong in asserting that Rafinesque applied the term *Toxylon* to the genus in 1817. The honors are therefore even and each of us is able to retire from the field without having fatally damaged the other's reputation—which is hardly to be regarded as the chief end of scientific controversy at any time.

NOTE *and* COMMENT

Laurel Philology.—In ancient days, the Greeks made use of wreaths to reward heroes, poets and victors in the Pythian games. These wreaths were usually made from the laurel tree of Southern Europe, known botanically as *Laurus nobilis*. In the course of time, such wreaths came to be used to distinguish the successful in any endeavor, whence the expression "to win one's laurels". In a similar way the word laureate indicated one who had won the coveted wreath or crown. Apparently laurel was also in favor for indicating academic honors and when loaded with its berries (Latin, *baccae,*) is reputed to have given significance to the world beccalaureate if it did not, in fact, directly suggest it. The word bachelor seems to have been derived from the same general source—though it is hard to see how a bachelor is entitled to any sort of laurels. Many who are familiar with the laurel in literature, are quite unaware that it is the very same plant that yields the bay leaves, so frequently used in cooking. In the Old World, the firm, evergreen leaves of this plant, intertwined with holly, were used for Christmas decorations from ancient times. In America the bay is a very common plant, though few who see it recognize it as the laurel so highly regarded by the ancients. As a tub plant it is ever present in hotel lobbies, restaurants and courtyards, though in such places it is so clipped and trimmed, that the phrase "under the green bay tree" would apply only to the tub in which it grows.

Uses of Black Locust.—The common black locust (*Robinia pseudacacia*) is rarely sawed into lumber, but its durability, when exposed to the weather, makes it a most desirable wood for fence posts, porch columns, props and similar uses. For more than a hundred years, locust wood has been in demand for trenails, as the pins are called which hold the timbers of ships together. According to *Forest Leaves*, a new use for the wood has been found and a promising industry has sprung up in places where the locust tree grows spontaneously which consists in making the wood into insulator pins, which carry the glass insulators on telegraph, electric light and telephone poles. The small size of the pins, makes it possible to use smaller locust trunks than are demanded by other uses. Since the locust tree sprouts readily from the roots, the timber supply of this wood is not easily exhausted, as some other woods would be under the same system of cutting.

RESISTANT CHESTNUT.—A note in *Science* suggests that some specimens of the American chestnut tree may be naturally resistent to the chestnut bark disease, which has swept large areas of this country bare of chestnut trees and bids fair to exterminate this valuable tree entirely. Living specimens, however, have been found in a region from which the blight had removed practically all the trees of their kind and other specimens of chestnut have been found that are still thriving in spite of the fact that they have been attacked by the disease and bear healed scars to prove it. If these trees prove to be really resistant, a new race of chestnut trees may be developed, to take the place of the variety now rapidly nearing extermination. The resistence of the chestnut to the attacks of the bark disease may also throw an important light upon certain phases of forest botany. There are many regions on the earth that show by their fossils, that trees now unknown to the region, once flourished there. To account for the complete disappearance of a species from a region, some climatic or geologic cause has always been invoked, but who knows how many times in the past, entire forests have been swept away, not by a great convulsion of nature, but by the silent though deadly onslaughts of some microscopic pest?

THE SPECIES CONCEPTION.—Is there any such thing as a species? Time was when even the botanizer believed himself capable of distinguishing species in all but the most difficult genera, but the technical botanist has continued to refine his idea of species until even the specialist finds it almost impossible to correctly interpret species made by others working in his chosen field. An excellent illustration of this is found in a recent contribution from the United States National Herbarium in reference to the allies of *Selaginella rupestris,* one of the fernworts. The author, G. P. Van Eseltine reports that L. M. Underwood's type sheet of *Selaginella arenicola* contains twelve specimens, six of which are true *S. arenicola* and the other six represent probably two other distinct species. In his day, Underwood was reputed to be an accomplished and skillful species-splitter, but he certainly must have been a bungler in comparison with present day operators, if he could mistake two different species for a third one and mount all on a single sheet as typical of a new species. It is likely, however, that no new species of *Selaginella* have been discovered in eastern North America since Underwood worked with the group. The so-called new species are simply the old species split still finer. Carried to its logical conclusion, the modern species conception makes the individual and the species synonymous and thus ends the matter. It has been well said, that species are merely judgments. All that modern refinements in species making has shown, is that the ordinary species has no definite boundaries, but may be considered anything the namer cares to make it. The ecologist who has investigated the causes that affect the external appearance of plants, is often amused at the importance attached to some insignificant variation in plants by the systematist who seizes upon it to establish a new genus or species. If the ecologists were not attending to more weighty matters, they would make so many reductions in specific names as to give the name-tinkers a shock from which they would never recover. Some day this is sure to happen. We stop here just long enough to point out that fact.

Trailing Arbutus Bush.—In many parts of the United States where the trailing arbutus (*Epigaea repens*) does not grow, a fairly good substitute is found in the trailing abutus shrub (*Abelia grandiflora.*) The substitute lacks the fragrance of the original and the charm that the arbutus derives from being one of the firstlings of the year, but it makes up for these defects in a way, by blooming generously nearly the entire season and by producing flowers rather larger than its prototype. *Abelia grandiflora* is a member of the Caprifoliaceae with elliptic, shining leaves that are evergreen in mild regions. It is regarded as doubtfully hardy, north of Washington, D. C., but it has withstood temperatures more than twenty degrees below zero in the editor's grounds. In severe seasons, its leaves and even its branches may be killed, but it comes up cheerfully from the underground parts and by July, is well covered with blossoms.

Puddling the Soil.—Amateur writers on gardening, frequently show, by most amusing misconceptions, how small is the stock of knowledge they possess on the subject chosen for elucidation. One that has appeared in several books recently is found in connection with the use of the word puddling as applied to soils. A puddled soil is one that has been worked when so wet that the soil crumbs have been broken up. In making bricks and pottery, the clay must be puddled for the very purpose of breaking up the soil crumbs and artificial ponds may be made to hold water, by covering the bottom with a layer of puddled clay, but a puddled soil is another matter.

In such soils, plants make little or no growth, because their roots have difficulty in pushing through the compact mass. As our amateur gardeners use the word, puddling means to pour water on the soil until it forms a puddle. This is all nonsense; at least Noah Webster never heard of it, if we can believe his justly celebrated dictionary.

ALGAE MIGRATION.—Land plants, as everybody knows, have been distributed in a variety of ways. In addition to the more obvious agents, such as the wind, birds, mammals and sling fruits, must be mentioned such purely fortuitous aids as railways and other trade routes, ship's ballast and, in the case of bacteria, the implements of the farmer and the feet of his domestic animals. Currents of water are usually considered sufficient to account for the distribution of algae, but some of these latter plants have been found in locations where it seems impossible for such currents to have carried them. In the Japanese *Botanical Magazine*, K. Yendo, points out that certain Japanese algae are now known to occur in the North Sea and others off the coast of England and France, while the Japanese alga flora contains several species whose home is in India, Australia or Europe. These species do not appear to have been discovered in Japan until after ships from the countries mentioned, began to frequent Japanese waters and the conclusion is that the plants have been carried to their new locations attached to the bottoms of ships.

THE LOGANBERRY.—There has always been some question as to the origin of the loganberry. It is reputed to have sprung up, fully developed, in the garden of a Judge Logan on the Pacific Coast and has always been regarded as a hybrid between the Western trailing blackberry and the red raspberry. According a recent Farmers' Bulletin, issued by the United States Government, the loganberry is now regarded as a sport from the blackberry without any admixture of the raspberry.

The loganberry is highly valued for making jam and jellies and for canning, but one who is familiar with real raspberry or blackberry jam is not likely to become enthusiastic over the loganberry product.

VALUABLE NEW SHRUBS.—The shrubs commonly cultivated in Northern gardens, have been known for centuries. Many are native species, possibly somewhat improved by cultivation and the rest are introduced plants which travellers have found cultivated in other regions. The discovery of America supplied European gardens with a multitude of new plants, while in our own country the discovery of China and Siberia in a botanical sense, is having much the same effect. In recent years a large number of promising shrubs have been brought into the country, partly through the efforts of the Arnold Arboretum and partly as the result of explorations carried on by collectors, sent out by the National Government. The flora of Siberia and China, though still little known, have great interest for us from the fact that these countries have a climate similar to our own and their plants, therefore, are likely to prove hardy with us. In a list of the twelve best shrubs recently introduced, we find several whose generic names must be unfamiliar to the great army of flower growers. Four of the twelve are species of *Cotoneaster,* namely *C. hupehensis, C. multiflora, C. racemiflora* and *C. nitens.* The first three have white flowers and when in bloom resemble *Spiraeas,* to which in fact, they are closely related. The fruits are red berries. *Cotoneaster nitens* has red flowers and black fruits. A large yellow wild rose (*R. Hugonis*) and two lilacs *Syringa Swegingowii* and (*S. reflexa*) are also on the list. A species of bush honeysuckle (*Diervilla florida* var *venustum*) is reported to be the handsomest of all its race. A yellow flowered shrub of early spring is *Prinsepia Sinensis.* It has thorny stems and multitudes of blossoms and appears to be a desirable hedge plant. *Spiraea Veitchii* is a tall shrub, the latest of the *Spiraeas* to flower. All these shrubs have proven hardy in eastern Massachusetts and it now remains to be seen, whether they will endure the winters of the same latitude further inland.

DANDELIONS IN JANUARY.—The very unusual weather of last January carried summerlike temperatures far into realms that at such seasons are ordinarily covered with snow and ice. The climax was reached about the middle of the month, when dandelions were in blossom in the editor's grounds, tulips were pushing up and the soil was free from frost. Exactly a year earlier in the same locality, the temperature was 20 degrees below zero and for more than two weeks the mercury did not rise above the freezing point at any time.

A PLANT EMBARGO.—The National Government often seems unfortunate in its selection of men to fill important positions. This seems to be true with regard to the committee or board in whose power it is to make regulations for the importation of plants into this country. Impressed with the fact that certain destructive plant diseases have come to us from foreign lands, the board has attempted to erect a sort of Chinese wall between us and harm, by forbidding the importation of practically everything that the florist and nurseryman uses. This is sure to work harm, not only to American growers, but to the plantsmen in Belgium and Northern France, as well. What appears to be particularly irritating to lovers of plants on this side, is the calm insouciance with which the few members of the board have dealt an unusually severe blow to decorative planting. A writer in *Horticulture* says of the new Plant Quarantine Regulation No. 37, "We can no longer import wonderful orchids from their native habitats; the peony creations of the great French hybridizers such as Dessert and LeMoine, the latter's splendid novelties in lilacs, philadelphus, deutzias, etc., must keep away from these shores. Blackmore and Langdon's fine begonias, Wallace's world renowned irises, the fine collection of British montbretias, Dickson's fine roses and the wonderful things of other British producers will not be tolerated here any longer. We must call back our own Wilson, he who collected so many valuable plants, roots and bulbs which draw thousands to the Arnold Arboretum—call him back from his present exploring tour of the interior of China and Japan with the statement that America does not want any of his plants." One can but wonder what Old World horticulture would have looked like, had England France and Belgium had a Federal Horticultural Board like ours.

DWARF SHORE FLORAS.—The plants of any region, as all ecologists know, are assembled in groups or associations, according to the character of the soil and the amount of water at their disposal, but in regions where there is a sharp transition from wet to dry, as on river and lake shores, the plants often have to make very rapid adjustments to the environment, which results in a great change in form. It is among shore plants that we most frequently find species with varying forms of leaves. Often there are three kinds: dissected water leaves, broad floating leaves and firm aerial ones. Illustrations will come to mind in such species as the water parsnip, water star-grass (*Heteranthera,*) water plantain, water crowfoot and various species of *potamogeton* and *polygonum.* A second feature of the shore flora is the dwarfing effect the situation has on plants from other regions that stray into it. Owing to the height of the water, probably, the lower shores are not suitable for growth until late in the season, so that such plants as grow there have to develop very quickly. This calls for a great reduction in vegetable structures. H. W. Clarke, who has investigated the matter, reports finding eighteen kinds of dry ground plants in such situations, many of them with only one or two leaves but still in flower or fruit. The black nightshade (*Solanum nigrum*) was found with only two leaves but with a berry of normal size that outweighed the rest of the plant several times. The author calls attention to the apparent dwarfing effect found in many plants that hug the water's edge. Such plants as water spearwort, water pennywort, *Salvinia* and *Azolla* are illustrations. The series culminates in the little *Wolffia* and *Wolffiella*, the latter when full grown not as large as a pin's head and yet a full grown flowering plant.

SWEETER THAN SUGAR.—Several plants are known which produce substances that taste sweeter than ordinary sugar. According to the *Kew Bulletin*, the fruits of *Sideroxylon dulcificum*, an African plant, are oval berries about like cherries whose thin pulp imparts such an intense sensation of sweetness to all kinds of acid fruits that they seem as if composed entirely of sugar. The sensation appears to be sensation only, and is not due to any saccharine quality. Another sweet species is *Thaumatococcus Danielli*. The most important plant of this kind, however, is one of the bonesets, *Eupatorium Rebaudianum*, a native of Paraguay. The substance that gives the peculiar property to this plant is a glucoside called estevin. This is from forty to fifty times as sweet as sugar. As the plant has no harmful substances in it, the leaves need only to be powdered to be ready for use. It is said that the plant can be produced at a less cost than can its artificial coal-tar competitor, saccharine. There is only one drawback to the sugary quality and that is, it has no nutritive value and cannot, therefore, replace sugar as a source of energy. In this connection *Kew Bulletin* mentions another plant, *Gymnema silvestre*, whose thick fleshy leaves when chewed so affect the sense of taste, that the sweetest or most acrid substances cannot be perceived for some hours afterwards.

Transpiration.—In all ordinary plants, there is a pretty constant inflow of water at the roots throughout the growing season and an equally constant loss of water from the leaves. In the case of some plants, the loss of water from the leaves may amount to many gallons annually. In the common mustard, each pound of dry matter made by the plant requires 900 pounds of water and alfalfa requires more than a thousand. The use to the plant of this "transpiration stream" as it is called, has been explained in various ways. It was once thought that it served to carry food materials into the plant, but it is now known that the food materials move independently of the water. Again, the evaporation from the leaves was supposed to act as a sort of boiling down process by means of which the plant was able to concentrate the matter dissolved in the water. From some calculations made by Chas. A. Shull and published in *School Science and Mathematics,* it appears that transpiration from the plant serves the same purpose that it does in the case of our own bodies, namely, to dissipate the heat energy and thus keep us cool. In bright sunlight, a leaf may receive enough energy to raise its temperature 30° a minute. It would require only a few minutes, therefore, for the leaf to reach the boiling point. That it does not reach this temperature is due to the moisture evaporated. It is well known that to evaporate a gram of water (about half a thimble full) 536 calories of heat are necessary. So long as the water continues to circulate through the plant, and evaporate from its tissues it is uninjured by the heat.

EDITORIAL

What a beautiful thing is Theory! It removes mountains, bridges gorges, surmounts all obstacles and teaches the young idea how to shoot without batting an eye. It is the chief reliance of the makers of text-books and manuals, it operates the machines in the physics laboratory without a hitch, it makes every reaction in chemistry come out as it should and it enables the biology teacher to take up any phase of his subject anywhere and at any time and attain proficiency at once. It makes teaching one continual round of pleasure; it keeps the reagent bottle full, the animals alive and the plants growing. It makes all the animals act exactly like they do in the books and assembles at a wave of the hand all the curious and illustrative material with which the botany teacher is wont to make his subject interesting. All this it does and more—that is, it would do it, if old Brass Tacks was not drawn into the discussion. Getting down to brass tacks, however, puts a different face on the matter. Brass Tacks says you cannot begin just anywhere in biology; that there is a sequence which must be followed. To be sure there are some teachers so adroit that it is all one to them whether the pupil begins with a seed big enough to see and handle or whether he works out the problem of photosynthesis by ogling a group of Pleurococcus cells through the lenses of a microscope. But the majority of us cannot do it. And worst of all, others are finding out that we cannot do it! Hasn't the registration in botany fallen off nearly 50% in the past ten years! Brass Tacks says that in botany at least, you cannot hope to do much for the pupil until he has some knowledge of the structure of plants in his head and some conception of what the structures are used for. The student may hold still while you lecture him about heterocysts, gametophytes, chromatophores, antheridia and gametangia, but he listens in a bored way, heaves a sigh of relief when it is over and next day forgets it all—well he forgets it the next day after the "test" is passed, anyway and sometimes before. As a general thing, the teacher talks too much. What he is trying to get his class to see is all so very plain to him and it is so much easier to tell them all about it than it is to induce them to see it for themselves that he talks and lectures and explains forever, working his wits and jaws when the pupils ouht to be working theirs—that is, their wits! Why, some of us are getting to the point where we actually prefer lantern slides, pickled specimens, pictures in the books and prepared microscope slides to fresh material. You see these prepared specimens are sure to come out right but fresh material!—it is likely to do something, or show something, that is not in the books and then where in the world would we be at? Brass Tacks says there is one best way of beginning botany, whether in fall, spring, the middle of winter or during vacation, but if he knows he declines to commit himself and we seriously doubt if he does know. But isn't it worth pondering? Are there not certain things about plants that ought to be in the heads of young students before we attempt to put in anything else botanical? Or doesn't it make any difference? Do our courses in botany permanently interest the students in plants, or do they come to like everything about plants except botany? Can we teach botany so that it will stimulate interest or is the proposition hopeless? Can interest be stimulated without contact with living plants? We pause for reply.

BOOKS AND WRITERS

An author who has worked over the materials in his book for more than forty years ought to be well enough informed on the subject to make an authoritative and comprehensive text. This is the situation with regard to Dr. Wliliam Trealease's "Winter Botany," a companion volume to his "Plant Materials for Decorative Gardening," issued in 1917. The new volume is a guide to the woody plants in the winter condition, but it would be a great error to regard this little volume as a mere Key. As a matter of fact, the author has crowded into the more than 400 pages an amount of information that is truly astonishing. No less than a thousand species comprised in 326 genera and 93 families are discussed. From this it will be seen that the book is not confined to our own woody plants, but includes practically all that may be encountered in any part of the United States, exotic as well as native. An important feature is found in the illustrations drawn in a manner rather superior to those found in the ordinary manuals. The keys are based on bud, leaf-scar and bark characteristics and extensive reference is made to the literature relating to each species, including other illustrations. Most interesting to the reviewer, however, are the many interesting observations appended to the descriptions. These are not the conventional "popular notes" found in books for the novice, but are observations of the highest scientific importance. Any person interested in the woody plants will find this an exceedingly useful volume. It is for sale by the author at the University of Illinois, Urbana, Ill., at $2.50.

Several new titles have recently been added to the series of "Rural Manuals" under the editorship of L. H. Bailey. One of these is the "Manual of Tree Diseases" by Dr. W.

Howard Rankin. It contains 36 chapters dealing with all the ills that trees are heir to, most of which are of fungus origin, though injuries from sun, frost, smoke, gas, lichens, etc., are included. The first four chapters deal with the general injuries that may afflict the seedlings, leaves, stems and roots, respectively. Then follow chapters devoted to the diseases of different groups of common trees, arranged alphabetically. In this list the pine leads with 23 different diseases, though the oak with 19 is a good second. The cause of each disease is given, the damage it does is discussed and the control methods, when such exist, are described. Final chapters are devoted to tree surgery and the preparation of sprays, spraying and dusting to prevent disease. There are many illustrations from photographs and a list of the literature referred to is given at the end of each chapter. The book contains 400 pages and costs $2.50.

"The Manual of Vegetable Garden Insects" by C. R. Crosby and M. D. Leonard, both of Cornell University, is another volume in the Macmillan series of "Rural Manuals." Like the other volumes this one gets down to business at once, starting on page 3 with an account of the 22 kinds of insects that make a specialty of grafting on the cabbage and its relatives, not forgetting to mention 62 other kinds that occasionally take toll of such crops in a way to make a German fear for the safety of his national flower. The insects that bother beans and peas, melons and cucumbers, potatoes, tomatoes, corn and many others are described in separate chapters and then comes a chapter on cutworms that fully explans where our young tomato and cabbage plants go. No fewer than 25 kinds of cutworms are mentioned, each one worse than the others. Other chapters describe the multitudinous varieties of blister beetles, flea beetles and numerous other unclassified pests. The closing chapter is devoted to insecticides, though all through the book, hints are given under the head of "controls" for applying the most poisonous of these mixtures. The title, control, the reviewer finds to his sorrow is a sad misnomer. A large number of the pests are illustrated. The pictures may be expected to add to the gardeners' depression and cause him to wonder how anybody can seriously suggest sending food to foreign lands. Fortunately only a few of the pestiferous brotherhood described may be found in our gardens at any one time. When any of these are discovered, this book will suggest the remedy if there is one! The price is $2.50.

The southern end of Florida is still *terra incognita* to the botanist. There are said to be upward of a hundred "hammocks" there upon which civilized man has never set foot. Tropical as to climate, and geographically close to the West Indies, it is not surprising that every expedition to the region results in the discovery of species new to the United States or even new to science. Dr. John K. Small, who has spent a good deal of time rummaging through these snake and alligator infested shades, has published several books and pamphlets on the vegetation of the region, among which is one on the "Ferns of Tropical Florida" in which several species new to our flora are described along with the better known ferns and fern allies. There are illustrations of each species, technical descriptions and more or less additional matter about each species. The book is a small volume of 80 pages and may be had of the author who is Curator of the New York Botanical Garden. The price is $1.55.

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Vol. 25. No. 2 Whole Number 121

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MAY, 1919

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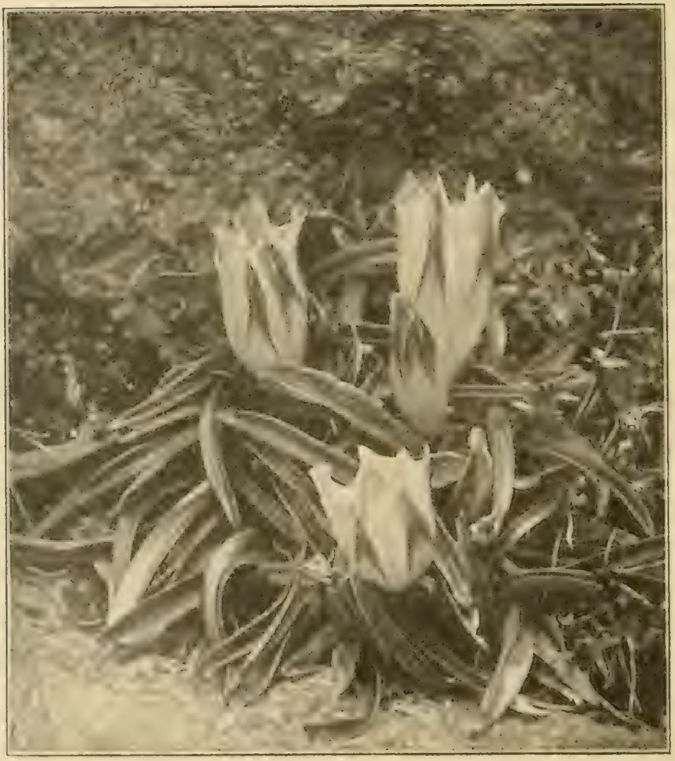

THE ARCTIC GENTIAN—*Gentiana Romanzovii.*

THE AMERICAN BOTANIST

VOL. XXV. May 1919 No. 2

In the apple orchard, now,
Every bough
Is a fragrant cloud of bloom
Whence the zephyr lightly shakes
Blossom flakes
Snow-like, scattering perfume.
—Sherman

THE ARCTIC GENTIAN

BY MRS. BLANCHE H. SOTH.

THE Arctic gentian *(Gentiana Romanzovii)* is always a curiosity to those who know only the deep blue gentians of lower altitudes. It is pale cream color, freely spotted and streaked with purple. The blossoms are large, sometimes two inches long, but they are very short-stemmed so that they do not rise much above their nests of thickish sheathing leaves.

This gentian occurs only on alpine peaks and in the Arctic regions and is found in Asia as well as in America. It blooms late in the alpine summer in the moister places among the sedges and grasses of the meadows above timberline. It withstands considerable freezing and is often in full bloom after the grasses have ripened and the willows and aspens in the valley far below are flaming in their autumn colors.

Growing with the gentian may be found red orpine, little red elephant and mountain avens. The foliage of these three plants turn a ruddy hue in ripening so that the patches containing the gentians are gorgeous in September. They are often an acre or more in extent and gleam in the clear sunshine of the mountain autumn like gems set in the golden grass that slopes down from the towering ruddy crags to the dark fringe of conifers at timbeline, 2000 feet below.

THE MANGROVE

By Vaughan MacCaughy.

ONE of the most abundant and characteristic trees along tropical and subtropical coasts, throughout the world, is the mangrove. This tree possesses a number of highly interesting peculiarities. It grows in salt water and forms impenetrable thickets with its branching ærial roots. It does not have true seeds, but is viviparous and the young plants are remarkably adapted for life in their marine nursery.

The mangrove is a notable land-builder. It has added thousands of miles of *terra firma* to the coast lines which it inhabits. The writer, who has been interested for the past decade in the natural history of Hawaii, has often deplored the absence of mangrove swamps in the Hawaiian Archipelago, both from the economic standpoint and from the standpoint of the general natural history interest of such a life zone. The absence of the mangrove from Hawaii is another evidence of the profound isolation of this Archipelago through long periods of time. The coasts of the Hawaiian Islands, both naturally and as a result of the devastations of man and his live stock, are singularly barren of arborescent vegetation. There are extensive areas, particularly on the islands of Kauai, Oahu, Molokai and Maui, that are admirably adapted to the mangrove and that would be greatly benefitted by the presence of this valuable land-building tree.

The mangrove tree was not generally known to have been introduced into the Hawaiian Islands, until the writer by chance discovered a fine specimen growing in a fish pond at the Kalihi Farm, near Honolulu, belonging to the Alexander Young Estate. This tree was planted by Mr. Allan Herbert many years ago and is now in flourishing condition. So far as is known to the writer, it is the only tree in the Hawaiian Islands. The mangrove is not mentioned by Hillebrand, or by any other of the many botanists who have visited and written of the native and naturalized plant life of Hawaii. The tree specified is not only in vigorous growth, but has produced many seedlings which have evidently become thoroughly naturalized. The evidence strikingly corroborates the writer's previous conviction as to the Hawaiian possibilities of the mangrove.

The family Rhizophoraceæ, of which the mangrove is characteristic, comprises 15 genera and about 50 species. *Weihea* with 12 species, *Ceriops* with 2 speceies, *Amsophyllea* with five species are all in the old world tropics, *Brugueira* with 5 species is tropical Asia and Africa and *Poga* with one species in Africa, *Rhizophora* has 3 species, *mangle* of tropical America and West Africa, *mucronata* and *conjugata* of tropical Asia and East Africa. These are widely distributed on the shores of tidal marshes and estuaries. The generic name is from the Greek, "root-bearing," and was used by early writers to designate various climbing plants with aerial roots.

The genus is almost unique in the plant world because the seeds have no true resting period, that is, they germinate at once on the plant. The radicle may reach a length of 3 feet, although usually less; it is club-shaped and heaviest at the apex, so that when the seedling finally falls from the tree, it sticks vertically in the mud, with the radicle down, ready to grow. This is one of the best examples of vivipary, as the embryo continues in a state of uninterrupted development from the outset. This is essentially seedlessness, from the physiological standpoint and germination in the usual sense, does not take place. This habit is of obvious usefulness, facilitating both the wide dispersal and abundant reproduction of these plants, as is testified by the extensive coastal mangrove swamps throughout the tropics. This extraordinary combination of structural and ecologic characters—vivipary, aerial roots, ability to grow in salt water, rapid lateral growth and freedom from fungus and insect pests—has given to the mangroves a tremendous advantage in the invasion of tropical coasts.

The name mangrove is derived, by corruption, from the original Malayan name *mangi-mangi*. The American species, *R. mangle L.*, is called Red mangrove, referring to the color of the inner bark. There are various trees in other regions that are called mangrove, that are not true mangroves and do not belong to the mangrove family. The white "mangrove" is *Laguncularia racemosa* of tropical America. The black mangrove is *Avicennia nitida;* also of tropical America and sometimes called olive mangrove. The mangrove myrtle is *Barringtonia acutanguta* of the East Indies. The milky mangrove is *Excaccaria agallochum* of Australia. The Tasmanian "mangrove" is *Acacia longifolia.* The river mangrove is *Aegiceras majus* of Indo-Malaya and Australia.

The American mangrove, which is the species represented in the Hawaiian Islands, is abundant along the coasts of Florida, tropical America, the West Indies and the Galapagos Islands. It forms vast monotonous green thickets and is the van of advancing vegetation along the salt marshes. Its maze of roots make it an effective land builder and it rapidly gives a foothold to less hardy species. In West Indian waters, for example, mangrove islands are formed so rapidly that in a few years they dot the shallow waters of bays which were formerly destitute of them.

The tree is round-topped, bushy and usually 15—20 feet high. Its branches are spreading, like those of the *hau* and its roots make almost impenetrable thickets. Sometimes, in inland situations, the tree grows erect, attaining a height of

70—80 feet, with a fine tall straight trunk, 3—4 feet in diameter and clear of branches for more than half its length. These trees, of course, yield the best timber. Normally, however, the tree is squat and broad and as it grows it throws out great numbers of ærial roots, which brace it well on all sides, like those of the Pandanus or banyan, so that the waves and tides cannot dislodge it. The roots branch profusely in the air and spread out laterally, forming a dense network. They are of special importance in supporting the numerous branches as in most cases the basal part of the primary trunk has an early death. The roots themselves are very stem-like in internal structure. The ærial roots or pneumatophores comprise an interesting feature of this tree. These are erect branches of the roots, which project above the mud and are provided with stomata and lenticels, into which air passes freely and is then carried by means of passages in the soft spongy tissues to the underground roots. Like certain other aquatic plants, the mangrove develops intercellular or internal hairs in its air-passages. These hairs are of ecological significance in connection with the fluctuations in the air-supply, which varies greatly, of course, with the rise and fall of the tides.

The bark is at first smooth, reddish brown, becoming .35-.50 inches thick and gray faintly tinged with red. The surface is irregularly fissured into low close ridges, these again are transversely broken into thin appressed scales, giving a very characteristic appearance to the old bark. The bark is red inside. It is rich in tannin and is used for tanning leather and also in dying. The Florida Indians formerly used the copious bast for an excellent cordage. A decoction of the bark is used by the natives of tropical American as a febrifuge.

The wood is very heavy, weighing 72.40 lbs. per cubic foot of seasoned wood. It is very hard, tough, and durable. It is close-grained and takes a beautiful satiny polish. The heartwood is dark-reddish-brown streaked with lighter brown, sometimes it is almost black. The sapwood is pale, with 40—50 seasonal rings. The pith rays are thin and broad; the ducts are open and diffuse. The wood makes an excellent fuel. As it is not attacked by teredos, it is sometimes used for wharf pilings. It also has been used for flooring. The mangrove, however, grows in situations that render very difficult the cutting and transportation of the wood and it is of little commercial importance.

The young branches are stout, terete, conspicuously marked by the large, oval, slightly elevated leaf-scars. The leaves are opposite and stipulate, and the blades are oblong, oval or elliptical. The upper surface is dark green and very glossy; the lower surface is pale, but also very smooth. The leaves are persistant for 1 or 2 years. It is interesting to note that the old leaves serve for water-storage organs. The old, yellowish leaves are twice as thick as leaves which have just attained their full size and the former are notably charged with water. The flowers are small, dull colored and not particularly conspicuous. They are produced continuously throughout the year in the axils of the young leaves. The flowers are perfect, regular and when fully expanded are about 1 inch in diameter.

The fruit is berry-like, 1 inch long, conical, rusty-brown, leathery and slightly studded with minute bosses. It is normally 1-celled and 1-seeded. It is subtended by the persistent reflexel calyx-lobes and perforated at the apex by the germinating embryo. The fruit is said to be sweet and edible and its juice, when fermented, yields a light wine. The apex of the seed is surrounded by a thin, albuminous, cup-like aril. The cotyledons are dark purple. The embryo is surrounded by a thin coat of albumen. The seed coat is thick and fleshy.

OFFICINAL DRUGS OF THE UNITED STATES

By Willard N. Clute.

THE spelling-book makes a difference of only one letter between the words official and officinal and the dictionary is not exactly clear as to whether it should make a distinction or not, but the pharmacist has no such hesitancy. By official drugs he means those upon which the pharmacopeia has set its seal of approval and which are regularly prescribed by the physician. By officinal drugs he means those usually kept in shops which may be used in domestic practice or for other purposes than medicine. Some of these may be substituted for official drugs when the others are not obtainable. There is also a long list of plants with medicinal properties which could be used by the physician but which are not for the very good reason that they are not as easy to obtain or are more difficult to prepare.

In the February number of this magazine, a list of the official drugs of the United States was given. To this list we now add all the common officinal drugs as well as some of those which are no longer used. These latter will be found under the title of non-officinal drugs. In most cases the parts most frequently used are added after the names.

As regards the sale of drug plants, it may be said that manufacturers do not usually care to purchase small quantities, though they occasionally do so. If one desires to market drug plants, he would do well to write to the manufacturers, stating the amount of the drug he has on hand, or can collect, and ask for prices. The price and the inclination of the manufacturer to buy, depends often upon the supply already on hand. Among the better known drug firms are Parke, Davis & Co., F. K. Stearns & Co., and Nelson Baker, of Detroit. The Lloyd Brothers of Cincinnati and Ely Lilly & Co., of Indianapolis.

Officinal Drugs of the United States.

Agrimonia eupatoria. Agrimony. Leaves.

Aletris farinosa. Colic root. Plant.

Anaphalis margaritacea. Everlasting. Plant.

Angelica atropurpurea. Angelica. Seeds.

Aralia nudicaulis. Wild sarsaparilla. Root.

Berberis Canadensis. Barberry. Bark.

Betula lenta. Black birch. Bark: oil.

Cassia Marilandica. Wild senna. Leaves.

Chelone glabra. Turtle-head. Plant.

Collinsonia Canadensis. Stone-root. Root.

Frasera Walteri. Columbo. Root.

Gillenia trifoliata and G. stipulacea. False ipecac. Root.

Hepatica triloba. Hepatica. Plant.

Hydrangea arborescens. Seven Barks. Bark.

Juniperus Virginiana. Juniper. Berries.

Leonurus cardiaca. Motherwort. Plant.

Liatris spicata. Button Snakeroot. Leaves.

Liriodendron tulipifera. Tulip-tree. Bark.

Monarda punctata. Bergamot. Leaves.

Nepta cataria. Catnip. Plant.

Pinus strobus. White pine. Bark.

Populus candicans. Balm-of-Gilead. Buds.

Quercus alba. White oak. Bark.

Rhamnus cathartica. Buckthorn. Bark.

Sanicula marilandica. Black sanicle. Plant.

Tilia Americana. Basswood. Flowers.

Trifolium pratense. Red Clover. Tops.

Tussilago farfara. Coltsfoot. Root.
Verbena officinalis. Blue vervain. Leaves.
Verbascus thapsus. Mullein. Leaves.
Veronica officinalis. Speedwell. Leaves.

Non-Officinal Drugs of the United States.

Achillea millefolium. Yarrow. Leaves.
Actaea spicata. Baneberry. Roots.
Adiantum pedatum. Maidenhair-fern. Leaves.
Alisma plantago. Water plantain. Leaves.
Ambrosia trifida. Ragweed. Leaves.
Andromeda arborea. Sourwood. Bark.
Linaria vulgaris. Toad-flax. Plant.
Aralia spinosa. Devil's club. Root.
Aralia hispida. Bristly sarsaparilla. Root.
Arum triphyllum. Indian turnip. Corm.
Asarum Canadense. Canada ginger. Rhizome.
Asclepias incarnata. Swamp milkweed. Root.
Baptisia tinctoria. Wild Indigo. Root.
Ceanothus Americanus. Jersy Tea. Root.
Comptonia asplenifolia. Sweet fern. Tops.
Coralorhiza odontorhiza. Coral root. Rhizome.
Corylus rostrata. Beaked hazel. Hairs from involucre.
Cynoglossum officinale. Hound's tongue. Leaves.
Dicentra Canadensis. Squirrel corn. Tubers.
Diervilla trifida. Bush honeysuckle. Plant.
Diospyros Virginica. Persimmon. Bark.
Dirca palustris. Leatherwood. Bark.
Dioscorea villosa. Wild yam. Rootstock.
Epigaea repens. Trailing arbutus. Plant.
Euphorbia corollata. White spurge. Plant.
Galum aparine. Goose grass. Plant.
Geranium Robertianum. Herb Robert. Plant.

Helenium autumnale. Sneezeweed. Plant.

Helianthemum Canadense. Frost-weed. Plant.

Heracleum lanatum. Cow parsnip. Root.

Heuchera Americanum. Alum-root. Root.

Hieracium venosum. Rattlesnake-weed. Leaves and root.

Hypericum perforatum. St. John's-wort. Plant.

Jeffersonia diphylla. Twin-leaf. Rhizome.

Kalmia latifolia. Mountain Laurel. Leaves.

Ledum palustre. Labrador tea. Leaves.

Liquidambar styraciflua. Sweet Gum. Gum.

Lycopus Virginicus. Bugle-weed. Plant.

Mitchella repens. Partridge-berry. Plant.

Myrica cerifera. Bayberry. Bark and wax.

Panax quinquefolia. Ginsing. Root.

Polygala polygama. Polygala. Plant.

Prenanthes serpentaria. Lion's-foot. Leaves.

Ptelia trifoliata. Hop-tree. Bark.

Brunella vulgaris. Self-heal. Plant.

Sabbatia angularis. Sabbatia. Plant.

Sarracenia purpurea. Pitcher plant. Plant.

Saururus cernuus. Lizard-tail. Plant.

Senecio aurens. Squaw-weed. Plant.

Spiraea tomentosa. Hardhack. Plant.

Scrophularia marilandica. Figwort. Leaves.

Typhrosia Virginica. Goat's-rue. Plant.

Trillium spp. Birthwort. Rhizomes.

Triosteum perfoliatum. Feverwort. Root.

Xanthorhiza apiifolia. Yellow-root. Root.

THE WESTERN AZALEA

By S. L. Watkins.

THE Western azalea (*Azalea occidentalis*) is a native deciduous azalea found in the Sierra Nevada Mountains of California, at altitudes of from 3000 to 5000 feet above sea level. In its native home it grows along the margins of streams and in wet, moist lands partially shaded. It is easily transplanted and will give a big display of blooms the first season. I have transplanted specimens that I know were ten or twelve years of age with no great apparent set-back.

When transplanting I dig a hole three feet square and about 3 feet deep and fill in with well rotted leaves and vegetable mold; if this is not handy we use old straw. We fill the hole about half full then set the bush and fill in alternately with good soil and sand. I have in many cases transplanted these out to the open sunlight and by giving them a good irrigating occasionally, they thrive and do well. Quite large bushes can be transplanted in tubs and half barrels and smaller bushes set in pots. Azaleas are easily transplanted in early spring and autumn when the years growth has ripened.

The abundance and brilliancy of the blooms of many of the forms of this plant is remarkable. Occasionally in their wild state a large patch is discovered with many color forms. Near my home is a rich moist meadow of 10 or 15 acres in extent and I have observed more color forms in this one particular locality than anywhere else. In this mountain meadow there are large dazzling snow white blossoms and other types range through the most intense shades of reddish orange to cream color and sulphur yellow. All the blossoms are tipped with pretty stamens, some of which are pink, others golden yellow and cobalt blue.

These plants bloom during May, June and July and when in bloom are intensely fragrant, scenting the air for a quarter of a mile. As to their hardiness I see no reason why they are not as hardy as the eastern type of azaleas. They are deciduous and drop their leaves after the first heavy frosts. When in bloom the bushes are completely covered with their great masses of flowers from 1½ to 3 inches across and a great number in a cluster.

THE SAND LILY

By Earl Lynd Johnston.

IT is remarkable that the first flower of spring on the semi-arid plains should be delicate, showy and fragrant. The early flowers are generally inconspicuous and with no claims to odor. The sand lily is the most striking exception. The bright green of the tuft of leaves which often appear before the last snow of winter has dissappeared is prophetic of the spring near at hand; the gleaming whiteness of its six-rayed waxen petals peeping forth from banks of sand and clumps of Buffalo grass in the frosty air of an early spring morning seems somehow to remind me of patches of snow here and there on the prairie that has recently surrendered to the benign rays of the returning sun. To me the sand lily seems to tie up winter with spring.

Sand lily! It's very name suggests a desert. The sunflower with its shining heads of gold and brown is a transient summer visitor that settles in our cultivated fields; the Russian thistle is a world-traveler that preempts lands once broken up from the raw prairie and, wind-driven, fills our fence rows with the debris of prickly stalks which leave a trail of seeds behind to bother the agriculturist. The butter cups are bright-hued beauties that love the cool spring moisture in the swamps and creeks. But the sand lily is a permanent spring resident. You are never dissapointed when you go out to look for it. Very early it may be found only in the nooks on sunny slopes, along the lee of dry arroyos or in the hollows of prairie trails.

This plant is a distinctly western one and altho it is generally known here as the "sand lily", its botanical name *Leucocrinum montanum,* being interpreted, is white mountain lily. I would suggest that when the name jugglers run out of reasons for changing a name that has been a household word with botanists for generations, to one which either advertise the name juggler or some unknown collector that they look into those whose botanic and common names conflict.

The sand lily spells spring to me in great big letters. Early in the morning when the air is yet fresh with frost and the lead-gray skies are more or less threatening a return of winter, I walk out to see if I can find any evidence that spring is coming and as I spy the clumps of green leaves holding their starry treasures it somehow warms my blood which has been stagnant ever since the first snow of the fall buried my single dandelion. The world is not the same to me when there are no flowers to cheer, altho I can watch the playful antics of the prairie dogs near my homestead or the flocks of beautiful desert horned larks as they flit from one seed stalk to another devouring seeds that would otherwise cause me many a weary hour next summer, yet they cause no quickening of the pulse for they are always with us. But when the sand lily sends forth its green leaves and its flowers peep from out of their emerald cups then I start out forthwith to see what this spring reveals of nature's secrets. Can the cold facts of science after all be right? Its beauty is only to attract some itinerant insect to its ambrosia that it may perpetuate its species.

Carefully pulling one of the slender white flower tubes which is from one to two inches long and splitting it I see the ovary near which nectar is found in small amounts. Its fragrance and the nectar suggests insect visitors; the length of the tube suggests a long tongued insect. I have consulted authorities on botany and entomology and can find no one who has any evidence of the visit of long tongued insects. Probably the white color, the delicate fragrance and the long tube indicates fertilization by one of the long tongued moths that fly during the night but then it is so early in the year. There are no special adaptations such as hairs, sticky fluid, etc., to keep out the ants and bees who would be unable to pollinate the flower.

When the seeds ripen, as they do, almost an inch underground, how do they get scattered? This is another sand lily secret. Perhaps they are not raised above the ground until the next spring when the new leaves push upward carrying the seed pods with them. At this time the ground will be moist and the seeds can germinate very readily.

The secret of its luxuriant growth of green leaves, some of which may be 10 inches long reminding one of grass blades is not so hard to understand. The plant is a stemless one and has deep growing fleshy roots which take up water and nourishment from the soil storing these up while there is an abundance and by the time the dry winds blow over the plains, the new roots and buds are already formed ready for their next awakening a spring hence.

THE GENDER OF RUMEX

By J. C. Nelson.

I HAVE sometimes wondered if modern authors were wholly justified in treating the word *Rumex* as masculine. The tendency in name in -x, especially those of a classical origin, is to be feminine. Of the genera mentioned in Gray's Manual, *Atriplex, Carex, Glaux, Hystrix, Ilex, Larix, Phlox, Salix, Smilax* and *Styrax* are all feminine. That the rule is not uniform is shown by *Panax,* neuter and *Ulex,* masculine; but the tendency toward the feminine is certainly marked, as seems to be the case in Latin words other than the names of plants. Morover, the Latin lexicon in common use—Freund's, revised by Andrews—gives rumex, "sorrel", as feminine and refers to a passage in Pliny the Elder (XI. 8, 1) which in my edition (that of J. Dalechamp, Frankfort, 1608) reads as follows:

> "Ceras ex omnium arborum satorumque floribus confingunt, excepta rumice & chenopode."

Here the form of the modifying word *excepta* shows that *rumice* is taken as feminine. I was unable to find any other classical passage in which the word was used in such a way as to indicate its gender and began to wonder if for once the divine Linnaeus had been caught napping. But on referring the question to a gentleman who enjoys what is in these days the rare distinction of being both a classicist and a botanist, Dr. A. S. Pease of the University of Illinois, he called my attention to the fact that while the reading in Pliny seems accepted by all recent editors, there is in the pseudo-Vergilian poem *Moretum* a line (73) reading thus:

"Fecundusque rumex malvaeque inulaeque virebant;" and that to his knowledge no other passage in the classics gave any clue to the gender of *Rumex*.

We have then as authority just these two passages, each directly contradicting the other and Linnaeus had exactly as much right to make *Rumex* masculine as one of us would have to make it feminine. It would hardly do to say that he had overlooked the passage in Pliny; Linnaeus was an enthusiastic and widely-read classical scholar and doubtless was familiar with both passages. But those who know how quickly his vivid imagination was aroused, can easily understand that the picturesque words of the unknown poet would make a deeper impression upon him than the more sober language of the naturalist—for if Linnaeus had not been a scientist he would most assuredly have been a poet.

Once again, therefore, the immortal founder of modern botanical science is vindicated and the name of the genus *Rumex* may continue to stand as it has been accepted by the generations who have followed him, as a masculine rather than a feminine substantive.

SYSTEMATIC BOTANY

By Charles W. Bowles.

WHEN attempting to study any complex subject like botany, it is of great assistance to many people to first learn a brief and easily understood "thread" that runs through the whole subject, serving as a basis to which all future data can be attached. Without such a clear, definite basis, or skeleton, the facts learned sooner or later becomes hopelessly confused. The usual text-books on any subject are like hundreds of labyrinths, every word may be the one and the only one that will lead us to a comprehensive understanding of what we are trying to learn, but hope often dies within us long before we come to the end of exploring the interminable number of "blind passages." If any plant is looked up in an encyclopaedia, the statement is usually made that "It belongs to the natural order of......". The accompanying "Outline of the Vegetable Kingdom" is an attempt to list all of these *natural orders* in a comprehensive way that will be brief enough for the average mind to grasp. After studying botany for thirty-five years, the confusion caused by the almost innumerable text-books on the subject, makes this "thread" seem like a small but safe raft or boat in the midst of the ocean of botanical literature that stretches away out of sight in all directions.

Prof. Willis Linn Jepson, of the University of California, at Berkeley, Calif., (to whom I am greatly indebted for corrections and suggestions) says of this: "The Outline of the Vegetable Kingdom which you have constructed, seems to me wonderfully compact, clear, and easy to follow....The orders

OUTLINE OF THE VEGETABLE KINGDOM.

SUB KINGDOM 1. { *Cryptogamia.* Plants that grow from SPORES. Familiar spores are "dust" from puff-balls & club-moss.

DIVISION 1. *Thallophyta.* Roots, stems, & leaves made of *same* materials.

CLASS 1. *Protophyta.* are Thallophytes reproducing mostly by *fission*

SUB-CLASS 1. *Schizophyta.* are motionless Protophytes: like vegetables.
ORDER 1. *Cyanophycæ.* BLUE-GREEN ALGÆ OR SEA-WEEDS.
ORDER 2. *Bacteria.* MICROBES, OR MICROSCOPIC FUNGI.

SUB-CLASS 2. *Zoophyta.* Protophytes that *can* move: like animals.
ORDER 3. *Flagellata.* MICROSCOPIC ALGAL ANIMALS.
ORDER 4. *Myxomycetes.* MICROSCOPIC FUNGUS-ANIMALS.
ORDER 5. *Peridineæ.* MICROSCOPIC RED-BROWN ALGÆ.

CLASS 2. *Zygophyta.* Thallophytes that reproduce mostly by *isogamy.*
ORDER 6. *Conjugatæ.* MICROSCOPIC GREEN ALGÆ.
ORDER 7. *Diatomeæ.* DIATOMS: ALGÆ CONTAINING SILICA.
ORDER 8. *Heterocontæ.* GREEN ALGÆ.
ORDER 9. *Zygomycetes.* FUNGI LIKE MOULDS.

CLASS 3. *Oophyta.* Thallophytes that reproduce mostly by *oogamy.*
ORDER 10. *Chlorophyceæ.* GREEN ALGÆ.
ORDER 11. *Phæophyceæ.* BROWN ALGÆ: SARGASSO SEA.
ORDER 12. *Oomycetes.* FUNGI: CAUSE ROT IN LIVE PLANTS.

CLASS 4. *Carpophyta.* Thallophytes that develop a *fruit* or *cystocarp.*
ORDER 13. *Rhodophyceæ.* RED ALGÆ. IRISH MOSS, AGAR.
ORDER 14. *Characeæ.* FRESH WATER ALGÆ: RESEMBLE ORDER 20.
ORDER 15. *Ascomycetes.* MILDEW, MOULD, TRUFFLES, YEAST.
ORDER 16. *Basidiomycetes.* MUSHROOMS, PUFF-BALLS, LICHENS.

THE BEST WAY TO IDENTIFY SOME PLANTS, IS TO PLANT THE SEEDS OR SPORES AND RECORD ALL CHANGES TILL NEW SEEDS OR SPORES GROW.

DIVISION 2. *Archegoniatæ.* Cryptogams with *different* materials in roots *etc.*

SUB-DIVISION 1. *Bryophyta.* Small asexual, large sexual generation.
ORDER 17. *Hepaticæ.* HEPATICA, SCALE-MOSSES: { Leaves are *not* in spirals.
ORDER 18. *Musci.* MOSSES: leaves *are* in spirals.

SUB-DIVISION 2. *Pteridophyta.* Large asexual, small sexual generation.
ORDER 19. *Filicinæ.* ADDER'S TONGUE, MOONWORT; FERNS.
ORDER 20. *Equisetinæ* HORSE-TAILS, SCOURING RUSH.
ORDER 21. *Lycopodinæ.* CLUB-MOSSES.

ALTERNATE GENERATIONS LOOK LIKE 2 DIFFERENT PLANTS.

SUB-KINGDOM 2. { *Phanerogamia.* Plants that grow from SEEDS. Roots, leaves, etc., composed of *different* materials.

DIVISION 3. *Gymnospermæ.* Phanerogams that bear *exposed* seeds.
22. *Cycadinæ.* TROPICAL FERN-PALMS.

DIVISION 1. *Angiospermæ.* Phanerogams that bear *enclosed* seeds.

SUB-DIVISION 1. *Monocotylæ.* First sprout from seed has 1 leaf.

ORDER 26. *Helobiæ.* MARSH & FRESH WATER PLANTS.
ORDER 27. *Glumifloræ.* BAMBOO, GRASS, GRAIN, SUGAR CANE.
ORDER 28. *Spadicifloræ.* COCOA-NUT, DATE, & SAGO PALMS.
ORDER 29. *Scitamineæ.* BANANA, MANILLA HEMP, GINGER.
ORDER 30. *Gynandræ.* ORCHIDS: LADIES' SLIPPER, VANILLA.
ORDER 31. *Liliifloræ.* LILY, ONION, ASPARAGUS, IRIS, PINE APPLE.
ORDER 32. *Enantioblastæ.* TROPICAL PLANTS.

SUB-DIVISION 2. *Dicotylæ.* First sprout from seed has 2 leaves.

CLASS 1. *Choripetalæ.* Sepals or petals of flower are *not* united.

SUB-CLASS 1. *Monochlamydeæ.* Choripetalous flowers *without* petals
33. *Verticillatæ.* AUSTRALIAN & ASIATIC TREES.
34. *Juglandifloræ.* BUTTERNUT, WALNUT, HICKORY.
35. *Quercifloræ.* ALDER, BIRCH, CHESTNUT, OAK.
36. *Salicifloræ.* WILLOW, POPLAR.
37. *Urticinæ.* ELM, MULBERRY, FIG, HOPS, NETTLE.
38. *Loranthifloræ.* SANDAL WOOD, MISTLETOE.
ORDER 39. *Piperinæ.* BLACK PEPPER, CUBEBS.
ORDER 40. *Hamamelidinæ.* WITCH HAZEL, SYCAMORE.
ORDER 41. *Tricoccæ.* BOX; TAPIOCA & CASTOR OIL PLANTS.
ORDER 42. *Centrospermæ.* RHUBARB, BUCKWHEAT, BEET, CACTUS.

SUB-CLASS 2. *Dialypetalæ.* Choripetalous flowers *with* sepals & petals.
43. *Polycarpicæ.* WATER-LILY, MAGNOLIA, BAY, PITCHER-PLANT
44. *Rhœadinæ.* POPPY, CABBAGE, TURNIP, MIGNONETTE.
45. *Cistifloræ.* VIOLET, TEA, MANGOSTEEN, CAMPHOR.
46. *Columniferæ.* COTTON, LINDEN, COCOA, KOLA NUT.
47. *Gruinales.* GERANIUM, NASTURTIUM, FLAX, ORANGE.
48. *Sapindinæ.* POISON OAK, HOLLY, MAPLE, HORSE CHESTNUT.
49. *Frangulinæ.* CASCARA, GRAPE VINE.
50. *Saxifraginæ.* SAXIFRAGE, CURRENT, GOOSEBERRY.
51. *Rosifloræ.* APPLE, ROSE, STRAWBERRY, CHERRY.
52. *Leguminosæ.* ACACIA, CLOVER, LOCUST, PEA, BEAN.
53. *Passiflorinæ.* PASSION FLOWER, PAWPAW, BEGONIA.
ORDER 54. *Thymelaeinæ.* THYME.
ORDER 55. *Myrtifloræ.* FUCHSIA, EUCALYPTUS, CLOVES.
ORDER 56. *Umbellifloræ.* DOGWOOD, IVY, CARROT, CELERY.

CLASS 2. *Sympetalæ.* Petals of flower *are* more or less united.

SUB-CLASS 1. *Pentacyclicæ.* Sympetalous flowers having *five* whorls.
ORDER 57. *Ericinæ.* CHECKERBERRY, SAL-LAL, INDIAN PIPE.
58. *Diospyrinæ.* PERSIMMON, EBONY, GUTTA-PERCHA.
59. *Primulinæ.* PRIMROSE, SALT MARSH PLANTS.

SUB-CLASS 2. *Tetracyclicæ.* Sympetalous flowers having *four* whorls.
60. *Contortæ.* OLIVE, ASH, AFRICAN CACTI, PERIWINKLE.
61. *Tubifloræ.* MORNING GLORY FORGET-ME-NOT, MANGROVE
62. *Personatæ.* POTATO, TOBACCO, FOXGLOVE, CATALPA.
63. *Rubiinæ.* QUININE, COFFEE, ELDER, HONEYSUCKLE.
64. *Campanulinæ.* CUCUMBER, MELON, PUMPKIN.
65. *Aggregatæ.* THISTLE, GOLDEN-ROD, CHRYSANTHEMUM.

seem to me well chosen and the result quite admirable as an elementary guide or outline for a beginner."

Such a system must be based on knowledge that is already possessed by the student concerning actual, tangible, definite conditions and materials; otherwise a whole bookful of *words* describing the subject is vague and more or less meaningless. This outline is practically a table of contents of Strasburger's "Systematic Botany," except that it has a few illustrative words after each technical one, but some explanation is necessary to point out a few broad facts or principles, that cement it all together and make a complete whole of it. Its chief advantage is that it introduces the student immediately to plants with which he is familiar, thereby combining practice with theory at the outset.

Reading over the names of the plants in the order in which they are presented in the Outline, gives a good idea of what kind of plants grow from *Spores* and what other kinds grow from *Seeds:* that is, it gives an idea of the difference between the general appearance of *Cryptogams,* (Sub-Kingdom 1) and that of *Phanerogams* (Sub-Kingdom 2). Of course plants have many ways of reproducing and scattering themselves, but the *Spore* and the *Seed* methods make an ideal basis for a systematic classification, chiefly because in each division these methods of reproduction do not vary much, while everything in any plant during all other periods of its life seems to vary often beyond recognition if the environment is not normal.

Going more into detail, the curious fact may be pointed out that in Division 1 *Thallophyta,* the *Algae* and *Fungi* form two practically parallel series similar in every way, except that the former are "self-supporting" (with rare exceptions) while the latter are parasitic excepting possibly the nitrogen bacteria. *Lichens* are *not* individual species; each lichen is composed of both an *algae* and a *fungus* living together symbiotically, or more or less dependent on each other for existence. *Fungi* are never green, but "Indian Pipe" and a few other seed plants resemble them in this way (*Monotropa* and *Pterospora*, Order 57; *Epiphegus* and *Orobanche*, Order 62); also a few *algae*.

A system of botany to be useful, must be made so that strange plants can be located in it so as to enable one to learn what is already known about their usefulness for food or otherwise. To find where a plant belongs in this Outline of the Vegetable Kingdom, it is necessary to read the definition given for each *Division, class,* etc., remembering that it may be difficult, especially for a beginner to identify some plants without knowing more or less of their life-history.

Division 1.—Mushrooms are not composed of the same materials that sea-weeds are composed of, but by comparing the two kinds of plants, it becomes clear what is meant by saying that each plant of Division 1 is composed of the *same* materials throughout, while a plant having the leaves, flowers, seeds, etc., composed of different materials, must be looked for in one of the other three divisions.

Division 2.—The *flowers* of all plants of Sub-Kingdom 2, may be called the *Sexual Generation;* all other stages of the growth of these plants constitute the *Asexual Generation.* In the plants of Division 2, the generation that corresponds to the flowers of Divisions 3 and 4, grows entirely differently. In Mosses (Order 18) the whole familiar plant is the sexual generation, while the little stalks and spore capsules (called *sporogonia*) that grow parasitically on the green plants, belong to the asexual generation—exactly the opposite of *Phanerogams* (Sub-Kingdom 2).

The sexual generation of Orders 19, 20, and 21, called *prothallus* or *prothallium* insted of flower, starts its growth as mushrooms do, from asexual spores in the ground; probably most people have never seen these prothallia as they are usually small and go to pieces when the large, familiar asexual ferns, club-mosses, etc., grow from them. Fern prothallia are sometimes called "young ferns" by greenhouse men; this is true in the same sense that a poppy *flower* is a "young poppy," if new plants are derived from it. Hence in Division 2, the familiar plants of Sub-Division 1 are in the *opposite* generation from those of Sub-Division 2.

DIVISION 3.—All plants of Sub-Kingdom 2 develop *Seeds*, while those of Sub-Kingdom 1 do not. One difference between Division 3 (Gymnosperms) and the plants of Division 4, may be seen by comparing the nuts from pinion pine and walnut trees, before the covering of the latter is removed.

DIVISION 4, Sub-Division 1.—If grass and onion seeds are planted in one flower-pot, and clover and beet seeds in another, the fundamental difference between the two subdivisions of Division 4 can be seen by watching the first sprouts that appear above ground; these first leaves are called cotyledons. Sub-Division 2.—By comparing the flowers of poppy and morning glory, it is clear what is meant by saying that the Petals of the former are not united and that they are united in the latter; which shows one difference between the two classes of this sub-division.

Class 1, Sub-Classes 1 and 2.—Flowers like those of beet or nettle are best, examined with a small microscope. Comparing such flowers with a poppy or a rose shows what is meant by saying that the former very small flowers have green Sepals only, while the latter have both green sepals and Petals that may be white or colored.

Class 2, Sub-Classes 1 and 2 (Division 4.) The ribs of an umbrella are arranged around the handle in a *Whorl:* The flowers of Sub-Class 1 are composed of four whorls; those of Sub-Class 5 are composed of five whorls.

The student is now prepared to plunge into the almost infinite variety of detail of plant life with some chance of not becoming hoplessly confused but a few more remarks may be made with reference to the Outline.

Looking over the names of the plants in the order listed in the Outline, the direction and progress of evolution in plant life becomes clear, the *Bacteria* have no sexes and therefore were never able to progress very far constructively, although they are certainly destructive enough. Each one is simply a microscopic stomach turned inside out which grows by absorbing nourishment. When large enough, a "string" grows around its "equator" and contracts till the microbe falls apart into new bacteria. The process of growth and subdivision, or *Fission,* continues as long as the food supply lasts.

In the higher plants the tendency is for the flower to be smaller than the rest of the plant and parasitic on it. In Division 2, the reverse is true in having the asexual generation parasitic on the sexual plants. In Mosses of Order 18, the small sporogonium ripens without destroying the large sexual plant. In Order 19, the ferns completely destroy their small sexual prothallia and send roots into the ground.

In Sub-Kingdom 2 conditions are reversed and amplified; not only are the flowers parasitic on the *old* asexual generation, but a *new* asexual generation is started and grows to the seed stage of development.

This gives a fairly comprehensive idea of botanical principles; the description is very brief and its treatment of botany is intended to be suggestive rather than exhaustive; the suggestions should be carefully followed up till thoroughly understood, if a clear understanding is to be maintained through the mazes of farther instruction and study.

[It may be noted that the names borne by the orders in the outline here given, differ in some respects from those used by many modern botanists. The tendency at present to have all the orders end in *ales,* but the divisions of the vegetable kingdom are essentially the same and the differences in the names need not confuse.—Ed.]

ADDITIONAL NOTES ON USEFUL PLANTS

THOUGH well toward a year has elapsed since you published the concluding list of "Food from Wild Plants," perhaps the following additional ones will not be barred. *Azalea nudiflora* bears a structure known locally in New England as swamp apple. A bush may have on it a dozen or more of these. This "fruit" is usually about two inches in diameter roundish or more or less irregular in shape, seedless, stemless, green, glaucous, solid, heavy, juicy, tender and rather toothsome. Children are very fond of them. They are not true fruits but are probably classed with the galls. The "cheeses" of round-leaved mallow *(Malva rotundifolia)* are relished by children.—*L. B. Cushman, North East, Pa.* [Mr. Cushman is correct in assuming that the swamp apples are galls. They contain, however, considerable moisture and are not to be overlooked on a hot spring day when other water is hard to find.—Ed.]

In your note on *Humulus lupulus* (hop) it is surprising that you failed to mention its use in yeast. *Alnus incana* made the best of charcoal in my boyhood days in Connecticut. —*J. M. Bates, Red Cloud, Nebr.* [Now that the brewing industry is on the decline, it might serve as a historical note to add that hops were once used in brewing. Contrary to common opinion, hops are not necessary to make beer and their addition to this fluid is a matter of comparatively recent date.—Ed.]

When your list of fragrant wildflowers was printed, the wild hyacinth was not among them. The porcelain blue blossoms are very fragrant and very showy. I have found them growing in Missouri along the roadside and patches of them on the sandy knolls in the timber.—*Mrs. Ida E. Stevens, Des Moines, Iowa.* [If Mrs. Stevens refers to *Camassia esculenta*, or *C. Fraseri*, as she probably does, it may be said that it does not appear to be fragrant in most of its range. It is practically inodorous here. There is a larger species, *Camassia quamash* in the Northwest. Perhaps this is the species reported as fragrant.—*Ed.*]

I see that you are leaving out one very malodorous flower from your Eastern list; or perhaps this is "personal equation," but it used to smell most villianously to me. This is *Trillium sessile*, which was our commonest species in Northern Kentucky. It had a smell like that which some snakes give off when they are enraged—vile and sickening. All over eastern Colorado and southward into New Mexico *Argemone intermedia* is common and known as soap-weed It has decidedly saponaceous properties.—*J. C. Nelson, Salem, Oregon.* [The list of malodorous flowers was published on page 65 of the volume for 1918. Additional flowers that are ill-scented are desired for this list. Should the flowers of Ailanthus glandulosus be included?—*Ed.*]

DIAMOND FLOWER IN OREGON.—It might be of interest to the readers of the notes on "Some Oregon Exotics" in the November number of the *Botanist*, to know that the little crucifer with the orbicular leaves that so long baffled our attempts at identification was at last determined by C. V. Piper as *Ionopsidium acaule* (Desf.) Reichenb., a native of Portugal and North Africa, known to the trade as "Diamond Flower." There is in the Gray Herbarium but a single specimen, from Algeria and I have up to the present found no record of its occurrence in the United States as an adventive species.—*J. C. Nelson.*

NOTE *and* COMMENT

ELDER BLOSSOMS.—Elder buds are such small dots of green and then of creamy white that it was no wonder I paused before two bushes and thought they looked unnatural. Almost every cyme had more or less big buds around its margin, six or eight times as big as the small ones. Is the plant trying to imitate its relative of the woodlands the hobble bush? My books say nothing about these enlarged flowers on the tips of the branchlets and I never noticed them before. The many little ones are spreading their white petals and stamens revealing a dot of white in the heart, a promise of jelly in September. The big blossoms are slow about opening. Finally the petal tips turn back and spread most deliberately. Five anthers supported by unusually stout filaments are disclosed. The anthers possess pollen but there is no trace of an undeveloped berry within.. There is also much more difference in the size of the buds than of the blossoms.—*Nell McMurray.*

GERMINATION OF WILD CUCUMBERS.—I was much interested in the article on the "Germination of Wild Cucumber Seed" in the November issue of *The American Botanist.* I have experimented a little with these seeds, but so far I have come to no definite conclusion as to whether it requires both cold and moisture to cause them to germinate or whether cold alone will do it. The plant is very common in this part of the country—central Indiana—and I have often planted it as an ornamental vine. When I first began I procured seed from vines growing along water courses and in damp situations and kept them dry until spring. Of course I failed to get many of them to germinate. After a few failures I concluded to follow Nature's plan—plant them in the fall—and had no further trouble. But some of the seed that I had kept dry through one winter were thrown away in the spring and some of them lay upon a cement floor under a shed, where they received no moisture except what was in the air, until the following spring, when five out of the seven seeds found there germinated, still lying on the cement and were planted and made as thrifty vines as those planted in the fall from recently ripened seed. If others have been experimenting along this line, I should be pleased to learn of their success.—*Mrs. M. E. S. Charles.*

PENNYROYAL OF EUROPE.—In your list of "Oils, Resins and Rubbers" ought you not to mention along with *Hedeoma pulegioides* as a source of Oil of Pennyroyal, the European plant, *Mentha Pulegium.* My druggist tells me that this was the original pennyroyal and is still used officinally in Europe. I found this latter species well established in pastures and along roadsides in the valley of the Mohawk River in Lane County, Oregon, in the summer of 1915—its first occurence in the West as far as I know.—*J. C. Nelson.* [It is quite true that the European *Mentha Pulegium* for which our species is named, was the original "pennyroyal", but it seems to have been entirely superseded by the American plant. If one looks up oils of pennyroyal in the Pharmacopeia, he will be referred to oil of *Hedeoma.*—Ed.]

NAME TINKERS EVER WITH US.—The zoologists, like the botanists, have their troubles over the activities of those who delight in changing names. The following is taken from the address of the retiring Vice-President of the Zoology Section of the American Association for the Advancement of Science delivered at Baltimore. "Will future generations be content to endure some of the enormities perpetrated under our system of nomenclature? Names we must have and recognition of specific, generic and other natural groups of organisms, so also uniformity and stability for the whole world of science, but I certainly have deep sympathy for the morphologists, cytologists, physiologists and other workers, who must perforce use some name to designate the material on which their work is based and who find a most chaotic assemblage of names from which to select. . . . . No taxonomist should have the heart and if possible should not have the power or opportunity, by shifting a genus or rearranging species, to foist upon a patient world the necessity of adopting a new combination in the names of common species universally referred to in anatomy, medicine, agriculture or other lines of applied science. I have elsewhere hinted at the discouraging nature of these nomenclatorial acrobatics to the student entering on zoological work. I have good reason to believe that many promising and brilliant young workers have been disgusted and have drawn to other fields of effort because of the complexities and apparently senseless chaos involved in the synonomy of many of our common animals. Think of thirty-six different specific combinations for the oyster-shell scale (that is, 36 the last time I had occasion to note the number) or twenty-six for the screw worm fly."

HARDY HOUSELEEKS.—The common houseleek, *Sempervivum tectorum*, often known as hen-and-chickens, is a plant of central Europe, that has been reported as an escape in Massachusetts and New Jersey. Elsewhere it is frequently planted in gardens, but like most of the Crassulaceae, it has the reputation of being tender in spite of its generic name. It is interesting, therefore, to note that it has proven perfectly hardy in the vicinity of Chicago in temperatures of more than ten degrees below zero continued for days at a time. This plant has the reputation of rarely blooming, but it also fruited in this region. The plant is very resistent to drouth, even growing on walls as its specific name indicates. Although other plants bear the name of live-for-ever, the name seems to belong to this species, both by virtue of its hardiness and its generic appellation.

LARGE EBONY SPLEENWORTS.—Fern Books usually give the height of the fertile fronds of the ebony spleenwort (*Asplenium ebeneum*) as not much exceeding a foot, but this is less than half the size of vigorous specimens. Mr. W. M. Buswell has recently sent specimens of this fern from Florida that measure twenty-five inches in length and writes that such lengths of frond are not uncommon in this region. All this, of course, is in keeping with the general rule that plants in the warmer parts of the globe tend to be larger than members of the same species farther away from the equator. It may be mentioned in passing that those who look for this fern in recent books under the scientific name assigned to it here, are likely to overlook it. The name it often goes by now, is *A platyneuron.* When Eaton wrote his monumental "Ferns of North America," he was well aware that the fern had been named *platyneuron* as well as *ebeneum,* but he deliberately selected the more descriptive specific name and those who care more for the proprieties than they do for priorities continue to follow his example.

STAMENS OF MEADOW PARSNIP.—The blooming florets of the meadow parsnips seemed to have too few stamens, but a microscope revealed the fact that the five stamens are there, alternating with the petals as one would expect, but they develop irregularly. Often only one is exserted, then again two or three may stretch out of one small flower. The petals are incurved bits of yellow and surround a green disk which resembles a miniature parasol. I was wondering why the wasps were visiting the old petalless florets and then discovered that they held ripened stigmas. The green disk becomes yellow and each is tipped with two styles and two stigmas making the flower cluster quite as attractive as do the previous yellow corollas. A motley company of two-winged insects were feasting there with wasps, especially the mud-dauber and the blue mud-wasp and an occasional yellow jacket and white faced hornet. It interests me to see how often insects prefer inconspicuous flowers; indeed in this way they often attract my attention to them.—*Nell McMurray.*

SPECIES EAST AND WEST.—The complete change of botanical horizon which is experienced by the collector from east of the Mississippi when he comes West, is illustrated by a comparison of two local lists of plants which I have just been making. I have before me an enumeration of species collected in Boone County, Kentucky and another from Chelan County, Washington. Both are of about the same length, there being 517 species in the Kentucky list, and 510 in that from Washington. Neither list claims to be complete and both doubtless contain numerous errors; but taking them as they stand, only 47 of the names, or about nine per cent, appear in both lists. As would be expected, most of these are introduced species, since the weed-flora of most regions in the Temperate Zone is fairly constant. Eliminating the species that are clearly introduced in both sections, there are left but 17 native species common to both lists and of these 17, some that are indigenous in the East are probably to be regarded as introduced in the West. The list is as follows:

Typha latifolia, Polygonum aviculare, Aruncus sylvester, Potentilla monspeliensis, Rhus Toxicodendron, Apocynum androsaemifolium, Apocynum cannabinum, Cuscuta arvensis, Verbena bracteosa, Veronica peregrina, Solanum nigrum, Plantago Purshii, Galium Aparine, Ambrosia artemisifolia Solidago serotina, Erigeron canadensis, Bidens cernua. While

it cannot be positively demonstrated, the conditions under which they occur lead to the strong presumption that if the Washington list had been made before the country was settled, about 11 of these would not have been found. Of the entire list, *Aruncus* seems to have the clearest title to undisputed citizenship in both regions. Cosmopolites such as *Typha, Polygonum, Potentilla* and *Erigeron* may be looked for almost anywhere and whether they are introduced or native at any particular station is often impossible to determine. Although the collector who emigrates to the West finds himself obliged to make the acquaintance of an entirely new flora, it can still be said of him "Coelum non animum mutat"; for the strangeness of the new plant-environment only stimulates his desire to become familiar with his new neighbors.—*J. C. Nelson.*

EDITORIAL

A lively controversy is going on between the American nurserymen and the individuals who comprise the Federal Horticultural Board in regard to Plant Quarantine 37 which proposes to exclude from this country after June 1st, practically everything that the florists, gardeners, nurserymen and plant breeders consider essential to their welfare. The reason given for such quarantine is that there are a number of pests on the other side of the world which might edge into this country were the bars not put up. If it were possible for such proceedings to do all they advertise, we might be more inclined to favor them, but if the plant pathologists of the Federal Horticultural Board cannot keep such pests out of carefully inspected and fumigated nursery stock, we have serious doubts that they will be able to prevent their entrance in materials used in packing, in ships ballast, clinging to the coats of garden and flower seeds, clinging to the coats of animals, or secreted here and there about the innumerable articles which we import from foreign lands. The horticulturists of the Government have not been able to prevent the spread of the boll weevil, the Russian thistle, the melon wilt, the chestnut disease, the white pine blister and hosts of others and having apparently lost confidence in their efforts, propose this exclusion as a last resort. As to the workings of the quarantine, Secretary Houston of the U. S. Department says, "It is also recognized that some of the plants and plant products whose importation has made them more or less popular will become rarities until they can be produced in this country, and if, as seems likely in a few cases, this turns out to be impossible, that it will be necessary for the public to do without them or to accept a substitute which can be produced here or which can be imported with safety." It is not likely that a policy of separating ourselves from the good things of this world to spite a few measly plant pests will commend itself to a free people. To be sure a race of landscape artists has sprung up in this country which is so patriotic that it will plant only native species, but while we admit that many handsome shrubs and trees originated in this country, we do not see how the best planting can do without the lilacs, the forsythias, the rhododendrons and many others that make our grounds attractive. We cannot help feeling that the horticulturists should have bent their efforts toward establishing safe methods of importing plants instead of proposing to shut ourselves up in magnificent isolation. Fortunately for us, a change in the political complexion of the country may make possible the modifying or rescinding of the obnoxious order. Its enforcement for a short time may possibly be of value in emphasizing the harm that such a sweeping order is sure to bring to the gardening movement in America.

* * *

A former subscriber to this magazine recently wrote us as follows: "I discontinued the *American Botanist* because I could not comprehend much of it. Since then I have been studying and am now reviewing the issues and am surprised that I could not have grasped the ideas they contained while the copies were coming to me." It is evident that others have had the same trouble, for of the large number who annually ask for sample copies, not one tenth subscribe. And here we have been flattering ourselves that we are making a magazine that a child could understand. A realization of our failure to meet the needs of the beginner, however, only emphasizes our dilemma, for the majority of our readers are people of mature minds who long ago passed the plant naming stage and are now interested in the philosophical side of botany. How to keep the beginner interested until he too finds attractive the study of plants as living things, is the question. If this catches the eye of any reader who finds part of the magazine unintelligible, we suggest that he continue to read and study in the assurance that an occasional review of back numbers will always reveal new facts to him. He may in time approach the state of mind of an enthusiastic old subscriber who recently wrote of his bound set: "I would rather have this set of books than any books on botany ever published. I like to get them out often when I want something interesting to read and all are equally interseting. I doubt if there is anything in this line that would be more popular in a library. Have suggested them to every librarian asking me what books to get." We have only 30 sets left.

BOOKS AND WRITERS

There is evolution in textbooks as in everything else. Twenty years ago, a first course in botany almost invariably consisted in sufficient instruction in naming plant parts to enable students to use a key and "analyze" plants in the expectation that the rest of the course would consist in collecting specimens, mummifying them and arranging them in an herbarium. Then came the era of physiological botany in which numerous experiments were performed with plants to prove that they are alive and functioning as other living things are. On the heels of this, young students were set to studying algae, mosses, ferns and the like, in an effort to discover the lines along which evolution has proceeded. When ecology, agriculture and forestry began to command attention a still different introduction to botany was demanded and this demand the present generation of book-makers is endeavoring to meet. Of this latter kind is Edgar N. Transeau's "Science of Plant Life" issued by the World Book Company, Yonkers, N. Y. This relegates to the back of the book much of the information on roots stems and other features once thought to be the natural pabulum of the beginner and plunges at once into the leaf and the life processes that take place in it. Matter pertaining to the ecology and reproduction of flowering plants follows this and then four chapters discuss the algae, mosses, ferns and their allies. Two very commendable features of the book are found in the suggestions for laboratory and field work that precede each chapter and the series of questions that follow the chapters. These questions, it may be added, are not questions on the text, but refers to subjects which require a knowledge of the text for an answer. The book is well illustrated and clearly printed, but it may be questioned whether the innovation of beginning chapters at the extreme top of the page will prove attractive. The price of the volume is $1.48.

Prof. Ellsworth Bethel has written a little folder on the "Flora of the Denver Mountain Parks" for the State Historical Society of Denver, Colo. In it some of the more attractive wildflowers are described and illustrated, along with much information regarding the botany of the State in general.

The writers of botanical books have been justly criticised for their failure to make them intelligible to the general reader. This charge, however, cannot be brought against Dr. C. J. Chamberlain's new book, "The Living Cycads." It is difficult to see how anybody with the slightest interest in plants can fail to be charmed by this lucid account of some of the ancestors of the flowering plants. Dr. Chamberlain has been studying cycads for nearly twenty years, during which time he has made expeditions to their native haunts in Mexico, the West Indies, Australia, New Zealand and South Africa. He knows the modern cycads fully as well as Dr. Wieland knows the extinct ones, and has studied practically all in the field. An account of his experiences in collecting cycads forms the first part of his book. In the second part, the life histories of the different members of the group are discussed and the third and last part the evolution of these forms is considered. It is quite astonishing to learn that the small sago palms (Cycas) of our greenhouses have living relatives that reach a height of sixty feet and others that, while they may be shorter, are more than a thousand years old. A characteristic form of fruit is the cone, suggestive of the pine cone but quite different, as may be realized when it is known that some cycads produce cones two feet long, more than a foot thick and weighing ninety pounds. All living cycads are dioecious and these heavy cones are naturally the carpellate ones. The ripened ovules in some of these cones are more than two inches in length. They are much relished by the black baboon and are carried off as soon as ripe. In consequence this species is on the road to extinction. Other interesting features of this group are the ciliated sperms, which are characteristic of lower groups but are found among Gymnosperms very rarely and among angiosperms not at all. These sperms are also the largest known and are easily seen with the unaided eye. The nucleus of the cell which functions as an egg cell is also visible, being quite the largest nucleus in existance and larger than some entire cells. A prefactory note to the book states that the intention of the University of Chicago Scientific Series, of which this is a part, is to present scientific subjects in such a manner as to interest not only the specialist but the educated layman. In this the series appears to have succeeded. The book costs $1.50.

"Botany for Agricultural Students" by John N. Martin justifies its title by drawing upon farm and garden plants and practices for much of its illustrative material. In this way the student who finishes a course in botany is likely to have acquired a considerable amount of information about crop plants. The book begins with the flower and its parts, seeds, seedlings, and kindred topics, after which attention is given to plant structures and their functions. Throughout the book emphasis is placed upon the practical side of botany and such operations as pruning, budding, grafting and propagating, receive adequate attention. The second and larger part of the book is devoted to the lower forms of plant life, classification and plant breeding. The chapters devoted to fungi and other injurious forms are well handled, but the reviewer questions whether too much time is not intended to be spent on the algae, mosses and ferns. The true agriculturist rarely has need of such information. On the whole however, the book should prove of much value in agricultural courses from the fact that its treatment is really related to the farm. It is an octavo of nearly 600 pages and 486 illustration and is published by John Wiley & Sons, New York at $2.50.

Practically everything that relates to gardening, however remote, is dwelt upon in "School and Home Gardening" by Kary C. Davis. The text is a combination of experiment and comment, the latter being above reproach as to scientific accuracy and lucid statement. Many of the experiments suggested, however, are open to criticism because they require weeks if not months for their completion. Children at the age of those to whom the book is addressed are incapable of maintaining interest in single experiments for so long a time. The book also contains a discussion of lawn making, decorative planting, a discussion of garden crops and methods of growing them, chapters an insect and plant injuries, garden calenders for the Northern and Southern States, directions for contests and club work and many other things. The book is a most suggestive one and should prove highly useful though it may not be found adapted for school use in its entirety. It contains 350 pages and 160 illustrations and is one of the Lippincott Farm Manuals issued under the editorship of Prof. Davis. It is published by the J. B. Lippincott Company, Philadelphia.

The teaching of agriculture has always been somewhat hampered by the lack of schemes for the laboratory side of the work. It is not always possible to carry on the usual operations of the farm in connection with school work and in such cases "Agricultural Experiments and Home Projects" by Henry J. Waters and Joseph D. Elliff, issued by Ginn & Company, should prove very useful. The book, or manual, consists of about a hundred exercises with blanks to be filled out, questions to be answered, tables to be made or other data secured, all of which is indicated in the accompanying text. The exercises deal with plants, animals and the soil and offer opportunities for much useful work. In the hands of a good teacher the book should prove of great value, though there is perhaps a tendency to call for more book work and less actual laboratory work than is desirable. Each exercise is accompanied by numerous references to text-books and bulletins making it easy for the student to continue investigation in any line of work that appeals to him.

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Vol. 25. No. 3 Whole Number 122

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AUGUST, 1919

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NAVAJO MOUNTAIN, FROM THE SOUTH

THE AMERICAN BOTANIST

VOL. XXV. August 1919 No. 3

Over the fields where the brown quails whistle,
Over the ferns where the rabbits lie,
Floats the tremulous down of a thistle,
Or is it the soul of a butterfly?
—Higginson.

A TRIP TO NAVAJO MOUNTAIN

By Willard N. Clute

CONTRARY to popular belief, the Grand Canyon of Arizona is not the only canyon of note in that part of the world. Nearly the whole northern border of the State, as well as the southern border of Utah, is a vast net-work of canyons, second only to the Grand Canyon in importance and in the opinion of many, of much greater scenic beauty. The region is one of little rainfall and is underlaid by porous sandstones which aid the escape of what little moisture reaches the earth. In consequence, desert conditions generally prevail. Here and there, however, slightly better areas of soil provide the hardy Navajo with food for his flocks and herds and he spends much of his time roaming from one feeding ground to another, bound by few laws save his own inclinations.

The Indian shares the desert with the centipede, scorpion, rattlesnake, and lizard, but there are no other human inhabitants. Over a region nearly three times the size of Massachusetts, the only white man to be found is the occasional Indian trader, who sets up his store, often the only house within a fifty mile radius, near one of the infrequent springs and supplies the aborigines with the few necessities of life that their mode of existence demands, in exchange for wool, hides, and the famous Navajo blankets.

OCT 21 1919

Owing to the difficulty of traversing the region the plants are imperfectly known. Wagon roads penetrate the interior for short distances only, or end on its borders where some trading post has been eseablished. The trails, which begin where the roads leave off, are few, indistinct, usually rough, and often precipitous. Horseback is the recognized method of travel and goods of all kinds are transported on the backs of pack animals. The region appears not to have attracted the botanist; in fact, large areas have never been visited by plant collectors. This is certainly true of Navajo Mountain, a vast pile of sandstone rising nearly two miles above sea-level near the center of this area of cliff and canyon, and nearly 200 miles from a railroad.

It was my fortune to spend more than a month on and about the mountain in the summer of 1919, during which time I made a fairly complete collection of the plants in bloom. A list of these with notes will be published later, the purpose of the present article being simply to record some general observations regarding the region. The trip was made possible through the kindness of Dean Byron Cummings, of the University of Arizona, who allowed us to join a party of his students engaged in excavating various ruins on the Navajo Reservation in an endeavor to solve certain problems connected with the origin and migrations of the cliff dwellers and pueblo Indians.

We joined the University party at Flagstall, and after a side trip of several days to the Grand Canyon, we set out by auto across the painted desert for Tuba City, a distance of about a hundred miles. The road is a fairly good one, though it crosses a region where there are neither villages or houses. The landscape is quite unlike that to which the ordinary traveller is accustomed. Here are great areas of bare soil, deep sand, and lava-strewn fields, stretching away to far distant cliffs of red, buff, gray-green, and other colors that justify the name given to this desert. The sparse vegetation includes several small species of cactus, yuccas, sage-brush, grease-wood, rabbit-brush and certain shrubby plants with the aspect of goldenrods. On the day we crossed the desert, the temperature was 104 in the shade, and the great expanse of bare red soil reflecting its color to the clouds gave the region some of the aspects of a furnace, yet because of the dryness of the air, the heat was not oppressive.

Tuba is situated in a small but fertile oasis and consists of about a dozen houses, among which is an Indian school. A few miles away, on a moist part of Moenkopi Wash, is the Hopi village of Moenkopi. Tuba was founded a long time ago by the Mormons. The streets are shaded by cottonwoods, brought in by these settlers, and there are also present numerous specimens of the Lombardy popular which latter tree is said to characterize Mormon settlements. The deep green of these trees was in decided contrast to the gray-green prevailing in all directions about the oasis. Various fruit-trees were also plentiful. It seems that we arrived at the height of the apricot season and were hospitably invited to help ourselves.

The following day we pushed on to Kaibato, fifty miles further in the wilderness, where a single white trader occupies the only inhabited house and traffics with the Navajos. The road thither would scarcely be called a road elsewhere. It wanders over rough and ragged rocks, around sand dunes and up and down sandy slopes where even the best autos must often be pushed when going up and dug out of the sand when they reach the bottom. At Kaibato the road ceases entirely and the next forty miles must be made on foot or on horseback. The trail starts out well enough but soon becomes decidedly crooked and precipitous, rounding the heads of canyons or descending to their bottoms by many zig-zags only to climb out in the same way on the other side. Under such circumstances a horse is about as much of an encumbrance as a help for he must often be led up one side of a cliff and pushed or urged down the other. Many of us elected to make the return trip on foot.

The canyon walls are frequently sheer cliffs of bare red sandstones with here and there a stunted pine of cedar rooted in the crevices. Along the more level portions of the route, sage brush and one of the joint firs (*Ephedra*) vied with each other for preeminence. Rabbit-brush and grease-wood formed open thickets where the soil was favorable. The sage brush in most areas is the dominane plant. It is seldom out of sight and even then its strong bitter-aromatic odor is sure to apprise one of its vicinity. In the shelter of the shrubs an occasional flowering plant appeared, usually small leaved and gray clad. The most noticeable of such specimens were low goldenrods, pentstemons, sunflowers, asters, and mallows, but they were never in sufficient numbers to become the dominant note in the landscape; in fact a hasty glance over the region would incline one to say that the desert has no flowers.

One noticeable difference between the desert and dry grounds elsewhere constantly came to our attention. The desert is almost invariably gray-green, while dry areas in humid regions have a yellow-green hue. The desert plants do not appear to be languishing for moisture; they have a cheerful bearing which seems to indicate a liking for dessication or a disposition to thrive in spite of it. July and August are the rainy months, though they are not moist enough for the fact to be especially noticeable. Nevertheless the light rains had a wonderful effect upon vegetation and we saw the desert becoming greener each day of our stay. Grass sprung up as if by magic and flocks of sheep and goats suddenly appeared and began to give animation to the landscape.

From Kaibato the trail steadily rises to Navajo mountain and when we arrived at its base we found ourselves more than a mile above sea-level, in the edge of a straggling forest of juniper and pinyon pine, interspersed with the quinine bush (*Cowania*). Here Endische spring gushes out, one of the few places in this vast region of parched sands where water can be obtained. This fact is considered of sufficient importance to warrant indicating the spring on all maps, though there are neither houses nor settlements near it. It is merely a fountain of living water in the desert which, if found, makes camping a pleasure and if missed, a hardship. A rill of some proportions runs away from the spring, but it soon becomes lost in the desert sands and its waters have practically no effect on the vegetation, except that a few willows, roses, columbines and evening primroses mark its course for a few hundred feet.

The sides of Navajo mountain are in most places too precipitous to admit of an ascent. There is an indistinct trail which begins near a ruined pueblo, "Red House", on the south side of the mountain, and ascends between two lines of cliffs to a spring and huge red rock on the shoulder of the mountain. From here the ascend to the summit is easy. The route usually taken, however, is by a trail up the eastern side of the mountain, ending at War-god spring at an altitude of about 8,000 feet. The ascend begins in a forest of juniper and pinyon pine, with an undergrowth of manzanita, but as one climbs upward he soon perceives that the plants present a rather distinct zonation. On the plain below are the sage brush and joint fir, next are the junipers and nut pines, and these merge into an open park-like forest of huge yellow pines at an altitude of about 7,000 feet. This forest continues upward nearly to the summit, but though it thins out upward, there is no dearth of conifers, for Engelmann's spruce and the Douglas fir occur in ever increasing numbers as the ascent continues. The only noticeable broad-leaved tree on the mountain is the aspen which forms extensive thickets in moist places and occasionally becomes a tree of considerable size.

A change still more striking takes place in the herbaceous vegetation as one goes upward. On the plain and in the juniper and pine forest, flowers are scarcely noticed, but when the yellow pine forest is reached, the earth is carpeted with flowers. Blue lupines are everywhere, mingled with painted cup and pentstemon. Goldenrods in dense tufts hold the open places with occasional clumps of asters and pink thistles. Chief of the floral list, however, was a handsome eriogonum whose abundant and cheerful blossoms formed extensive patches of bright yellow everywhere. Along the tiny stream that runs down from War-god spring, grows an evening primrose with bright yellow flowers three inches or more across—quite the largest flower of the genus, so far as I can discover. On sunny slopes grows another member of the Onagraceæ with notched leaves in rosettes after the manner of the dandelion, but with flowers at least eight inches long and correspondingly broad. These open pure white but soon turn to pink and wither by the end of the day.

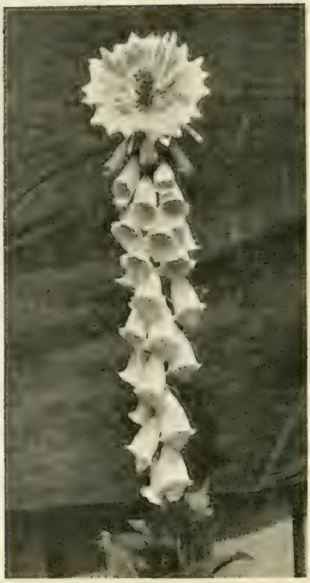
Another member of the evening primrose family divided its allegiance between mountain and plain. It was especially partial to dry soils and was at its best on sunny slopes or flaunting its creamy-white blossoms from the precipitous banks of the numerous arroyos. On the plains, a mallow with a most unusuall color in which red, orange and yellow seemed striving for ascendancy, was very common and widely distributed. One of the most interesting plants encountered was the pine sap (*Pterospora Andromeda*). It occured wherever the yellow pine did and was so abundant as to attract attention many times. It was in full flower, standing often more than two feet high. One unusually thrifty specimen had twenty-one spikes of flowers.

The top of the mountain presented nearly the same aspect as the slopes above 8,000 feet. There was a pretty little yellow sedum thickly scattered in open places, a pink and white antennaria, handsomest of its race, phlox, heuchera, pentstemons, and painted cups, but no conspicuous masses of color.

From the summit of the mountain we could see the "Nonnesoche Arch" or "Rainbow Bridge", the largest natural arch in the world, which spans Bridge Creek Canyon about six miles from the Colorado river. This arch was discovered by the leader of our party in 1909. Though so near as to distance, it was thirty-five miles away by the steep and crooked trails traversed and required two days to reach it. On the return trip several members of the party decided to go directly across the mountain but found the way barred by various cliffs and canyons, and when they finally arrived in camp were thoroughly convinced that "the longest way round is the shortest way home."

Our visit to Segi Canyon and the remarkable cliff ruins there, our trip to Monument Park, our adventures on the journey to the snake dance in the Hopi village of Walpi, and our trip back to civilization is not a part of this narrative, though all of these excursions yielded additional plants that were quite new to us and possibly new to science. We encountered a number of people interested in the plants used by the Navajos and expect later to publish notes on this phase of the subject.

This account should not be closed without some acknowledgement of the aid aid rendered us by the proprietors of the trading posts, all of whom were exceptionally kind and resourceful and quite willing to neglect their own affairs to facilitate ours. A certain breakfast at Frazer's, after a night spent under some diffculties in the desert, will long be a bright spot in our memory, as will our stay at Kayenta under the hospitable roof of Mr. John Wetherell, surrounded by its own tiny oasis. This place is the Mecca for all who would visit this interesting region, and Mr. Wetherell himself has been companion and guide to all sorts of sight-seers, from botanists to ex-presidents, and we trust may long continue to point out the delights of the region to the traveller and naturalist.



A FREAK FOXGLOVE

By J. C. Nelson

IT would be hard to imagine a more complete departure from the typical form than is shown in the foxglove (*Digitalis purpurea*) pictured herewith. This species, which is common in cultivation and an abundant escape in the Pacific Northwest, penetrating far into the mountains, has never shown any special tendency to variation, except in the matter of color, where a wide range may be observed. The abnormal specimen above shown was found in the garden of Mr. T. B. Jones at Salem, Oregon. At the time of collection (June 6, 1919) the stem had reached a height of 115 cm. At 76 cm. the first flowers appeared, and 26 of these, normal in every way, had opened. The abnormal, seemingly terminal inflorescence—for it must be regarded as a coalescent group rather than a single flower, was 10.5 cm. wide, and included 25 perfect stamens and 5 narrow petaloid bodies colored like the corollas. The color of this monstrous corolla, a lavender dotted with maroon, was a trifle paler than that of the normal flowers. About 21 bracts, apparently representing sepals, surrounded the base. Six long and narrow flat-tubular corollas, wholly unlike the flowers below, were also included in the inflorescence subtended by this circle of bracts. Two of these may be seen in the photograph. The large bud which occupied the center, apparently replacing the pistils, has later developed into a continuation of the main stem, but at a different angle, bearing normal flowers.

In order to produce this monstrous inflorescence, which at first sight would be taken for a single saucer-shaped corolla, several flowers would have to be brought into a whorl by a shortening of the internodes; then the tubular corollas would have to be conceived as splitting down one side, opening out flat and coalescing by their edges; but whether this represents what actually did take place can only be conjectured. Has anything similar to this been observed by any reader of the *Botanist?*

[Prof. Nelson has here given us an most excellent illustration of that condition is plants known as peloria. The first recorded occurrence of peloria was made by one of the students of Linnæus who found flowers of the common toad-flax (*Linaria vulgaris*) with five spurs instead of the usual single one. Since then the condition has been noted in the snapdragon (*Antirrhinum*), nasturtium (*Tropoelium*), beard tongue (*Pentstemon*) and many other forms of the Scrophulariaceæ. Peloria is ordinarily defined as the return of an irregular flower to the regular condition. Since irregular flowers are regarded as having arisen from regular ones, the phenomenon is likely to occur in any species with normally irregular flowers. In the case of the foxglove, the form is a very old one, and has been propogated from seed. The form known as *gloxinioides*, formerly *monstrosa*, is of this nature and seeds may be bought of most seedsmen. The illustration so clearly shows how peloric flowers look, that we trust it will enable others to discover the same condition in different species. Records of such occurrences are always of much interest.—Ed.]

FAMILIAR WILD FLOWERS OF FLORIDA

By W. M. Buswell.

FLORIDA is often called "The land of flowers" which is probably understood to mean that flowers are found here in greater abundance than in other parts of the country. It is a land of flowers, when other places are lands of snow and ice, yet I have seen more wild-flowers at one time in New England, or on the prairies of western Canada, than I ever have in Florida.

There are flowers every day in the year, which cannot be said of every state, but the number found in any one place does not seem to be unusually large, for many of them are found in one county, and not in others.

Many of the towns send out pamphlets, and small books, inviting you to visit "The land of flowers" but the flowers described are usually cabbages, celery, and other garden truck, not at all descriptive of a land of flowers. These seem to be about the only flowers that are well known in the state, and unless it is something to eat, or something that can be sold, very few have ever noticed that it grew here. A very few books such as the Northern States are so well supplied with, would probably create an interest in this subject, but as so few of these plants have ever received a common name, it is a difficult task to describe them in a popular way. Not all of them have been neglected in this way however, for many of the common wild flowers of Florida were christened long ago, in lands that are far from tropical.

People from the north will be able to name many of the plants they find here without the aid of a book, and familiar as they may be to them in the North, they will be found worthy of renewed interest in this southern climate. The well known partridge-berry, that blooms for a short time in northern forests, is a common plant of Florida groves, but down here it pays no attention to the calendar, and continues to bloom through most of the year. The common black-berried elder, is another plant that does the same thing, having flowers and fruit on the bushes at the same time. Not always on bushes either, for it is often a tree here. Plants are not generally supposed to have intelligence, yet there seems to be no other word that so well describes some of the things they do. Why don't these plants continue to bloom in the North, as long as it remains warm, as they do here? We know that it would be a waste of energy, as the fruit would never mature. But how do the plants know this?

In my walks through northern forests, I often ran across one or more of the odd little "Indian pipes", always in some shady, secluded spot in the woods. I never expected to find them in any other situation. Gray says "Dark, rich woods" yet my first Florida pipe was growing in a situation as far from this one could imagine. It was on a rail-road track, not over a foot from one of the rails, in a bed of hot Florida sand. It is said to be parasitic on roots, or decayed vegetation, but such things must have been very scarce in this spot. In Florida, woods with damp, rich leaf-mold, such as wood ferns love to grow in, are not common. I know of only one such spot in this locality: about half way down the State, and here I found many things that I have found in no other place.

Whenever I enter this place, I seem to have left the south and am back once more in some cool, shady glen of the northern hills. Beds of the familiar partridge-berry carpet the ground, Dense masses of tall, green ferns in all the low, more shady places, with scores of green Jack-in-the-pulpits for neighbors. To offset this large gathering of preachers, and keep them within bounds, there are rows of devil's walking sticks, always on guard just behind them.

Vines of various kinds trail over bushes and old logs, or swing from tree to tree: smilax, wild grape, trumpet-creeper, woodbine, poison ivy, and the fragrant, yellow jessamine. We find also witch-hazel, blueberry, and blackberry, red maple, basswood, hickory, and flowering dogwood, nearly all of them well known plants of northern forests. There are also several of the southern oaks in this collection, and though the fruit of these trees scattered over the ground, should be familiar to everyone, the trees may be a puzzle at first.

In January, great splashes of red are seen in all damp woods, and swamps, when the red maples are in bloom, and later, about the last of January, or the first of February, when they are in fruit. They are a much brighter red here than in the north, and no other trees can equal them as landscape painters. In the "fern garden" are cinnamon, and royal ferns, the brake, the two chain ferns, and several less familiar southern ferns. The most abundant species are the Florida crested fern, and one that seems to lack a common name: *Nephrodium molle.*

Fronds of these two species often measure five feet in length, the glossy, dark green fronds of the crested fern making the greatest show of all. In more open spots the ebony spleenwort is common, the Boston fern on old logs, while the gray polypody decorates nearly all of the trees and stumps.

This is only a small part of the show, but as most of the others are natives of the south, they are not on the familiar list. The two common magnolias, and the sweet gum tree, are abundant here, as they are in most other suitable spots in the south, and it is very easy to identify them. In the fields, one may find golden-rods, and asters, of some kind, nearly every month in the year. Then there are Lady's tresses, mullein, pokeweed, blue flag, and blue toad-flax, common both north and south. The Black Cherry is apparently more abundant here than it is in the north, but has changed its dark coat for one of gray, which seems very appropriate for Dixie land.

Though many of the Florida wild flowers are strangers, and hard to get acquainted with, they are all very interesting, and worthy of more attention than they have ever received. Here there is always an excuse to follow the grassy trail, and the certainty of seeing something new on every trip, adds much to the excitement of the chase.

In early March the flowering dogwoods are in bloom: Warblers are beginning to arrive from farther south. There are flowers and wild bird songs for every hour of the day. Then as you wander homeward at the close of the day, the air filled with the wonderful fragrance of orange blossoms, the mockingbirds singing their good-night songs from the house tops, in the west, the tall picturesque southern pines sharply outlined against the brilliant, golden sunset sky, you may feel, as I often have, that nothing could be more wonderful, or more perfect.

A BOTANICAL TRIP TO CATALINA ISLAND

By George L. Moxley

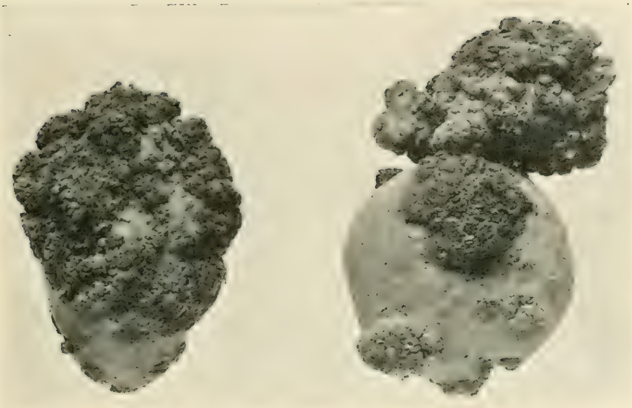
MAY 6th and 7th, 1919, two of us went to Cataline Island, which lies some twenty miles off the coast of Los Angeles County, in quest of some wild flowers for the State Wildflower Exhibit at San Francisco.

Landing at Avalon a little after noon, we started on an exploring tour in the hills back of the town. The Island is all hills and canyons and most of them are quite steep and rugged. We purposely chose wild-looking canyons as best suited to our adventuresome spirit, as well as being most likely to furnish what we were hunting for.

The first flowers to claim our attention were the wild hyacinths, (*Dichelostemma capitata*), which grew plentifully on the broad floor of the canyon bottom. As we clambered up the sides we found a fern that is unfrequent on the mainland, but is very common on the Island—the viscid gold back we may call it for lack of an English name. Its Latin appellation is, at the present time, *Pityrogramma viscosa.* Higher up, in open grassy places, we found many Mariposa lilies which we did not identify as to species, and in the same locality there were quantities of golden stars (*Bloomeria crocea*). On this hillside we came upon a single bush of *Solmanum Wallacei,* which, with its large clusters of deep violet flowers, presented a most striking appearance. This was the only plant of this beautiful species that we saw.

Next morning we started out along the stage road to the Isthmus. This took us more on the seaward side of the hills we had slightly penetrated the afternoon before. The vegetation was much the same in some respects, there being many grassy slopes with the gold back fern and a maidenhair fern, (*Adiantum Jordani*). Along this road we found a sticky monkey flower (*Diplacus puniceus*), and a beautiful "California lilac" (*Ceanothus arboreus*). Among the plants of the pea family were a large bush lupine, having long spikes of beautiful blue flowers, which we referred to *Lupinus longifolius,* a broom-like plant with large clusters of small, yellow flowers, *Syrmatium dendroideum,* and a low trailing plant with round heads of yellow flowers, *Syrmatium ornithopum.*

One of the plants most interesting to us, from the fact that this is the type locality, is one that has until recently been placed in the buttercup family, but which is given a family all by itself in the new Flora of North America. It is a shrub or small tree with rather large white flowers and seed pods somewhat resembling those of Paeonia. The family consists of this single genus and the genus of only two species, this, *Crossosoma Californicum,* being insular in its habitat and the other *C. Bigelovii,* of the desert.



THE POTATO WART DISEASE

Life on the farm is prevented from becoming monotonous by a constant influx of new plant diseases and insect pests in spite of the quarrantine of the Federal Horticultural Board. This time it is a new disease that threatens the nation's stand-by, the white or "Irish" potato. The disease does not attack the potato plant above ground and is therefore not conspicuous during the growing season, but the tubers become infested with rough, brown spongy or wart-like outgrowths of varying size which turn black with age. Potatoes thus attacked are rendered unfit for food. The disease is known as potato wart. It is caused by a parasitic fungus, *Chrysophlyctis endobiotica*, and belongs to a group of parasites that attack the stems, leaves and roots of many kinds of plants. The fungus was discovered in 1896 and has only recently been found in the United States along the Atlantic Seaboard. It is hoped that its further spread may be prevented and anyone knowing of its presence in his fields should report it to the Department of Agriculture at once. We are indebted eo the Bureau of Plant Industry for the photo from which our cut was made.

FLOWERS OF VARYING COLOR

IN this magazine for August 1918 there was printed a preliminary list with notes of flowers that vary in color. Sometimes the variation occurs during the period of blooming, in other cases the plants regularly produce flowers of more than one color. In response to the call for additional species of this kind, Prof. J. C. Nelson sends the following list from Oregon. In explanation of the descriptive terms Prof. Nelson says, "When I say, for example, 'white to pink' I mean that there are all gradations between the two; if I say 'white or pink,' I mean that no such gradations occur but that it is frankly the one or the other. The one named first is the predominating color:"

Flowers of Different Colors.

Camassia Quamash, dark blue or white.
C. Leichtlinii, light blue or cream-colored.
Stenanthium occidenale, greenish or purplish-brown.
Iris macrosiphon, white or yellow.
Iris Missouriensis, violet-blue or white.
Eriogonum compositum, white or yellow.
E. nudum, white or rose.
Claytonia sibirica, white or pink.
Claytonia spathulata, white or pink.
Claytonia parviflora, white or pink.
Claytonia diffusa, white or pink.
Silene anglica, white or pink.
Silene antirrhina, white or pink.
Silene Hookeri, white or pink.
Silene Douglasii, white or pink.
Lynchnis coronaria, crimson or white.
Anemone Piperi, white or pink.
Cheiranthus Cheiri, orange, brown-reddish, or yellow.

Arabis platysperma, rose-colored or white.
Arabis patula, purple to white.
Ribes sanguineum, white to pink.
Ribes viscossimum, white or purple.
Rubus laciniatus, white or pinkish.
Lupinus polyphyllus, cream to violet-blue.
Trifolium flavulum, reddish to yellowish.
Trifolium arvense, pink or whitish.
Pachistima Myrsinites, yellowish or purplish.
Ceanothus cuneatus, white or bluish.
Sidalcea campestris, white to pink.
Malva moschata, rose-colored or white.
Viola adunca, purple or white.
Daucus Carota, white or purple.
Moneses uniflora, white or pink.
Anagallis arvensis, orange-scarlet to white.
Centaurium minimum, pink or white.
Convolvulus arvensis, white or pink.
Convolculus sepium, white or pink.
Polemonium carneum, salmon-colored or blue.
Nemophila atomaria, white or pale blue, with black dots.
Lappula cupulata, white or blue.
Lappula occidentalis, white or blue.
Prunella vulgaris, white through lavender to dark-purple.
Verbascum Blattaria, yellow or white.
Pentstemon diffusus, blue or violet.
Scrophularia californica, dull purple or green.
Digitalis purpurea, white to purple.
Campanula Medium, white to dark purple.
Lactuca pulchella, blue or violet.
Centaurea Cyanus, white, blue, pink or violet.

FLOWERS PARTI-COLORED.

Calochortus Tolmici, petals yellowish, tinged with purple.

Lilium columbianum, orange with brown spots.

Fritillaria lanceolata, brown-purple with greenish-yellow spots.

Erythronium giganteum, petals cream with yellow and orange spot at base.

Erythronium montanum, petals white with orange spot at base.

Erythronium pariflorum, petals yellow with paler spot at base.

Iris tenuis, white marked with yellow and purple.

Sisyrinchium birameum, dark blue with yellow eye.

Sisyrinchium Macounii, purple with yellow eye.

Sisyrinchium idahoense, dark blue with yellow eye.

Cypripedium montanum, lip white, veined with purple.

Corallorhiza maculata, lip white, spotted with crimson.

Epipactis gigantea, petals greenish, veined with purple.

Nymphaea polysepala, petals yellow, often tinged with red.

Batrachium aquatile, petals white, yellow at base.

Delphinium Menziesii var. *ochroleucum*, petals blue, bordered with white.

Delphinium bicolor, petals white, veined with blue.

Aquilegia formosa, flowers scarlet ouside, yellow inside.

Raphanus Raphanistrum, petals yellow, veined with purple.

Sieversia ciliata, petals yellowish, with purple veins.

Trifolium oliganthum, corolla purple and white.

Trifolium tridentata, corolla purple and white.

Trifolium oliganthum, corolla purple and white.

Vicia villosa, corolla violet and white.

Lotus bicolor, corolla yellow, wings white.

Lotus gracilis, standard yellow, wings and keels rose-colored.

Lupinus micranthus, upper petal blue with white dots, lateral petals dark blue.

Lotus bicolor, upper blue with a white stripe dotted with blue lateral petals dark blue.

Oxalis oregana, petals white with purple veins.

Viola Hallii, 2 upper petals dark violet, 3 lower lemon-yellow.

Cornus Nuttallii, petal-like bracts of spring flowers white, of fall flowers purple.

Dodecatheon dentatum, corolla white with 2 purple spots at base of each lobe.

Dodecatheon latifolium, corolla dark-purple with yellow center.

Gilia bicolor, limb pink, tube yellow.

Gilia gracilis, limb purple, yellow tube.

Myosotis scorpioides, blue with yellow center.

Linaria Elatine, upper lip lemon-yellow, lower purple.

Collinsia tenella, corolla blue and white.

Collinsia grandiflora, upper lip light blue, middle lobe of lower lip purple, the lateral lobes dark blue; throat white.

Gratiola virginiana, tube yellow, lobes whitish.

Lonicera hispidula, corolla reddish outside, yellowish inside.

Downingia elegans, corolla blue with white and yellow center.

Coreopsis Atkinsoniana, ray-flowers yellow with brown base.

Flower Changing in Anthesis.

Trillium ovatum, from white through pink to dark red.

Draba nemorosa, yellow becoming white.

Gormania oregana, yellow becoming pink.

Tellima grandiflora, greenish to dark red.

Holodiscus discolor, white becoming yellowish.

Vicia Cracca, blue (rarely white) turning purple.

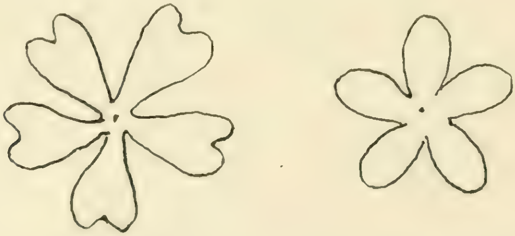
Lathyrus sulphureus, pinkish-yellow, fading to ochraceous.

Myosotis lutea var, *versicolor,* pale yellow to blue, then to violet.

PHLOX NOMENCLATURE

By Willard N. Clute.

ARE there two distinct species of phlox included under the name of *Phlox divaricata?* This is the question that is likely to arise in the minds of those who examine specimens of the ordinary sweet William from extremes of its range. Those who know only the eastern form are likely to describe the flowers as having obcordate or emarginate petals but western plants differ from this and often—perhaps always—have petals that are entire. Botanical Manuals, written in the Eastern States, usually describe the flowers either as having emarginate petals or make the description flexible enough to include both forms. There is one exception to this statement, however. That observant botanist, Alphonso Wood, in his "Class-Book of Botany", published more than sixty years ago, describes the eastern form as having emarginate petals and then adds: "b. *Laphamii* Lvs ovate, *pet obtuse, entire.* Wis. (Lapham), Western Reserve (Cowles) and southward, not uncommon". Having cultivated plants from the East along side of our common form of the Middle West for some time, I am inclined to believe that there are constant differences between the two. The flowers of the eastern form are somewhat larger and the


Eastern Form Western Form

PHLOX DIVARICATA

divisions of the corolla are narrower where they join the tube. The emarginate form apparently does not occur in this region, at least it is not common. The illustration shows the outline of two blossoms made by drawing a line around the fresh flowers. It is likely that the western form should be known as *Phlox Laphamii* (Wood). In order that the range of the two forms may be more clearly indicated, if there is a geographical difference, readers are asked to examine specimens of the phlox in their herbariums and report on the form as it occurs with them.

BOTANIC GARDENS

There is perhaps a tendency in the speech and thoughts of most people to confuse botanic gardens and experiment stations and to consider the terms as more or less synonymous. In reality the origin and functions of the two institutions are very different. In the first place, botanic gardens are much the older of the two. They can be directly traced back to the gardens attached to the monasteries of Europe, where medicinal herbs as well as nutritious vegetables were cultivated and their properties studied. Perhaps one may not be far wrong in tracing the origin of modern botanic gardens to the dawn of history, for we find not only in Hebrew traditions, but in early records of Egypt, Assyria and China that gardens wherein was "every tree that is pleasing to the sight and good for food" were desirable possessions of the race.

The earliest garden of which we have any representation is that of Thothmes III in Egypt about the year B. C. 1,000 which was planned by the head gardener of the gardens attached to the temple of Karnak. Perhaps, however, the Chinese rather than the Egyptians are to be credited with having first had the idea of a real botanic garden, seeing that it is clear that several of their early rulers despatched collectors to distant countries to bring back plants which were cultivated for their economic or medicinal value. From a list of plants thus introduced by the Emperor Wu Ti in the second century B. C., the banana and the sweet orange have been identified along with many others by modern scholars.

Coming to a more recent period of history we have an exact contemporary description of a monastic garden of the ninth century with its attendant "Physic Garden," which was the direct origin of the gardens established in connection with the medical faculties of the Italian universities of later centuries.

As the monks were bound to live for the most part on pulse, vegetables and fruit, the cultivation of the monastery garden was of the greatest importance to them. It is difficult to speak too highly of the debt which botanical science owes to the care the monks of the middle ages took of their gardens and to their knowledge of drugs and plants.

Then came the Renaissance with its great revival and widespread interest in science of every kind, not least in that of botany. With a real growth in the knowledge of plants and their uses, there grew up also a great number of ridiculous or superstitious beliefs about plants, which accurate investigation and experiment have entirely dispelled. Then were founded the physic gardens attached to the medical faculties of the universities, one of which, at Padua, founded in 1545, still exists in very nearly its original plan. These physic gardens gave students of medicine an opportunity of studying the plants from which they compounded their drugs and were also a source from which they might obtain such plants in their future practice.

Very soon after the founding of the gardens at Padua, there were introduced into them, plants other than those of merely medicinal value. This was doubtless due to the revival of interest in plants themselves and the desire for collecting them from other lands, which seem to have been awakened in the middle of the sixteenth century by the then recent geographical discoveries.

From this time onwards there appears to have been a kind of rivalry between the various gardens as to which could grow the greatest number of plants collected from all parts of the world. Along with the interest aroused in the collection and cultivation of all kinds of plants, there was also displayed great interest in the description and illustration of them. Not to speak of many such herbals published on the Continent, there are the famous ones of Gerard, Tradescant and Parkinson in England, the authors of which must not only have been most successful gardeners, but very patient and exact observers also.

Thus we come to the foundation in the seventeenth century of gardens by private or municipal benefactions for the purpose of allowing the public to observe and study plant life. This leads us to the establishment of the greatest of all botanic gardens, the Royal Botanic Garden at Kew, in the eighteenth century and its like in many cities of Europe and their descendants or copies all over the civilized world.

The first botanical garden in the tropics seems to have been that of the island of St. Vincent, founded by the British Government in 1764. But the magnificent gardens of Buitenzorg in Java at Calcutta and at Peradeniya in Ceylon, together with that at Rio de Janeiro are striking examples of the benefits such gardens confer upon the countries in which they are situated, by the introduction of new crops, such as cinchona in India and rubber in Ceylon.

We have seen that botanic gardens, in their origin, were based on utility. This is perhaps the best distinction that can be made between their function and that of the public garden or park, where plants are grown primarily for the purposes of ornament or shade. The essential difference is apt to become blurred, especially in the case of botanic gardens situated near to towns and needs to be re-emphasized from time to time. There is no reason why botanic gardens cannot or should not be ornamental, but this should be strictly subsidiary to their main purpose.

What then are the proper functions of a botanic garden, large or small, in the neighborhood of a great city, or in a small tropical island? First, there is the scientific function. New plants are introduced from other climates and other lands and these are grown and studied so as to discover whether they are capable of adaption to their new surroundings and whether they are likely to be of value, economic or æsthetic.

Second only perhaps to plant introduction should be the maintenance, so for as it is possible, of a representative collection of the more interesting and useful plants of the surrounding country and especially of species allied to those in cultivation. The latter are of great interest to the taxonomist, to the plant breeder and to the pathologist, because of the likenesses and differences they exhibit in comparison with the species grown for use. In a cotton-growing island, for example, nothing could be more appropriate or more useful, so far as botanic gardens go, than a representative collection of the native cottons, many types of which are in process of extermination owing to increasing strictness regarding close seasons. With them, it is quite conceivable, may be lost characters or qualities which would some day prove highly valuable.

Again, botanic gardens afford botanical students opportunity for research in plant biology and pathology. One can hardly place a limit to the benefits that agriculture and horticulture have derived and may derive from researches in this direction. Our modern science of genetics, for instance, is derived from the studies of Mendel in a monastery garden in the last century. By work on the lines indicated by this discovery, races of useful plants are being multiplied and modified so as to be more exactly suitable to the variable conditions in which economic plants are grown and to produce far greater crops than their ancestors. Studies which lead to such results can best be carried on in botanic gardens, where there ought to be found a greater amount of material and more scientific appliances than are possible in most private establishments.

Besides the scientific function of botanic gardens there is their educational aspect. In an article on this subject in Science, June 29, 1917, it is well remarked that the notion that knowledge can be acquired from books is too prevalent; the idea that one can read about nature and thus acquire knowledge of nature is as misleading as to suppose that one can acquire knowledge of business by reading about business. We must distinguish between information and knowledge. Information may be obtained by reading, but knowledge can only be acquired by contact with and experience of realities. Hence botanic gardens open to the public a source of real knowledge of plants; and there is no more pressing problem today than to learn how to grow plants and how to grow them in increasing quantities and of increased value in every possible situation.—*News Imperial Department Agriculture, B W. I.*

NOTE *and* COMMENT

AGE AND PROTOPLASM—Casper L. Redfield of Chicago, has repeatedly called the attention of scientists to a theory advanced by him which purports to account for the improvement noted in various animals and man by the effect of age on protoplasm. In the trotting horse, for instance, he finds that young animals are not the record-makers, but that powers of such animals increase up to a considerable age. He finds, also, that the progeny of such sires appear to be influenced by age in the same way, the older the animal at the time of breeding, the likelier the colt will be to show improved speed. Redfield asserts that such relationships exist elsewhere and even concludes that the difference between genius and mediocrity is man is a matter of age only. He finds that no really great men of the caliber of Darwin, Edison, or Galileo have been sons of young parents. According to his theory, the male parents for at least three generations must have been more than 32 years old when their children were born. In three generations a man has seven male ancestors and if the total of their ages when their children were born does not total at least 234 years, the third generation will not be eminent. Since all great men are obviously related to many mediocre persons, some explanation for their superiority must exist and this theory seems to be a step in solving the riddle. Whether it is the right explanation or not depends upon further investigation, but we may here call attention to something similar that exists in the protoplasm of plants. Growers of melons and certain other vegetables are aware that old seeds produce more fruitful plants then do young ones. A certain age or maturity of the protoplasm seems to be necessary. It is well known too, that seedling peonies do not show their capabilities the first time they blossom. The flowers may be nearly single the first season and steadily increase in size and number of petals for several successive years. The double pink daisy (*Pyrethrum hybridum*), often requires four or five years to show the double feature. At the first blooming the flower heads may exhibit the "single" condition and the novice finding no double flowers among them may hastily conclude that his is inferior stock, but in a few years doubling may begin. All this shows that some change in the protoplasm must take place with age. As a matter of fact, growing old may be assumed to be due to changes in the protoplasm of the individual. Seekers for an elixor of life might find these facts worth investigation.

BOBOLINKS UNDER THE BAN—When the bobolink forsakes our northern meadows and returns to the South-eastern United States for the winter, he is known as the rice-bird or reed-bird. One of these names has been earned through his fondness for the ripening grains of rice. To protect the rice crop, the Secretary of Agriculture has authorized the shooting of the birds. There are certain restrictions placed on the shooting, however. The birds must not be shot before sunrise nor after sunset and they may be shot only at certain times of the year. One would think that if the object is to protect the rice crop, the more bobolinks shot, the better, and that there should be no restrictions as to when and how the birds were killed. Since the shooting is hedged round with restrictions it is apparent to us that the protection of the rice crop is quite secondary to providing gentlemenly sport for the pot hunters.

RARITY OF CONOPHOLIS—In various issues of this magazine for 1912 and 1913, writers commented on the extreme rarity of the broomrape (*Conopholis Americana*). One indefatiguable collector reported that he had never seen it growing in fifty years, collecting in regions where it was supposed to grow, and all agreed that it should be marked rare in the books.

In this connection it may be noted, that on May 31st of this year, the editor of this magazine found more than an acre of maple, ash, and oak forest thickly strewn with this plant, at Sæger's Lake, near Valparaiso, Indiana. A ground fire had recently swept through the wood destroying the herbaceous vegetation and the clumps of flowering shoots of *Conopholis* were very noticeable. This by the way was the editor's first sight of the living plant, another indication, as he regards it, of the rarity of the species.

VINEGAR BEES—Those curious combinations of bacteria and yeasts known as vinegar bees, have at last come to the attention of the United States Department of Agriculture. The Government experts, however, do not seem to think very much of them. They report that the bees are also known as beer bees, wine bees, and Australian bees. Specialists from the Bureau of Chemistry say vinegar bees are only wild yeasts, but had they investigated them with a microscope instead of a test-tube so much of the wild would have not entered in their statements. It is stated that the primitive process for making vinegar bees was to expose a mixture of corn meal and molasses to the air until it became filled with yeast and bacteria. The significant thing about the bees is that they appear to be able to turn sweetened liquids to vinegar much more rapidly than other yeasts and bacteria can. As to the vinegar produced, it is certainly quite usable, but not as acid as cider vinegar. This defect may be remedied, however, by concentration of the product.

HIGH PRICED BLUBERRIES—When blueberries are quoted at fifty dollars, each, the announcement is likely to give a shock even to those accustomed to increases in the high cost of living. This, however, is the price that is offered for blueberries! Some time ago, F. V. Coville of the United States Department of Agriculture discovered that the blueberry can be cultivated as readily as other plants if care is taken to grow it in acid soil of the kind known as upland peat. Then followed an effort to secure large-sized berries from which to breed superior plants. The fifty dollars now offered is for plants which produce berries of the diameter of a penny. Let nobody assume that berries of this size will not be forthcoming, for two plants with such fruits have already been secured. If there are other plants in existance, now is the time to exchange them for cash. Full particulars of the offer may be secured by addressing Miss Elizabeth C. White, Lew Lisbon, N. J.

FRAGRANT WILDFLOWERS.—Apparently it is going to take a long time to make a complete list of our fragrant wildflowers. Those that have a strong and lasting odor are easily numbered, but those whose odors are so evanescent as to be seldom perceived except in masses may long escape detection. This appears to be true of the common eastern lupine (*L. perennis*). In the mass, the flowers have a distinct and pleasing fragrance. Another species scarcely suspicioned of being odorous is the black willow (*Salix nigra*). The tree does not bloom until the last week in May, long after most willows have shed their staminate catkins, and when the twigs are well clothed with leaves. Then it puts forth a multitude of long, yellow catkins that are so strongly perfumed that the odor may be perceived for a considerable distance.

SWAMP APPLES.—The note on page 64 of the May *American Botanist* is somewhat misleading. The honeysuckle apple on *Azalea* is gall-like but not a true gall. Galls are caused on plants by the sting of an insect made in depositing an egg, and possibly by the further irritation of the larva in getting its living. The easiest illustrations are found on oak trees and very different ones on the hackberry, cottonwood, and willow. Rose bushes also show them frequently in the wild state and the common goldenrod, *Solidago Canadensis*, has one that must excite curiosity. It is found about the middle of the stem forming an ellipsoidal swelling about half an inch in diameter. Cut it open and you will find a worm until he has eaten his way out. The excrescence on the *Azalea* is a true fungus; that is, a true plant-parasite and no more a gall than the cedar apples are. It is called in science *Exobasidium Azaleae*. Your readers will find it interesting to note the species of willows that attract the gall insects without fail and those that they always pass by. Our western tree willow (*Salix amygdaloides*) is never used by them nor is the introduced white willow. *Salix cordata* and its close allies is used the most; *Salix fluviatilis* less frequently. I have never seen galls on the weeping willow. Let us hear from others.—*J. M. Bates.* [According to the modern representative of Noah Webster's justly celebrated tome, galls are produced by fungi, insects, mites, and worms. The excrescences on the *Azalea* therefore are true galls as the term is defined. It is, however, common to class as galls only those specimens that are produced by the sting of an insect or, rather, by the thrust of its ovipositor in inserting an egg in the plant tissues. In connection with the genus *Exobasidium* it may be observed that the *Azalea* is not the only heathwort parasitized. Some fifty other species of the genus *Exobasidium* produce galls on various species of Ericaceæ in Europe, and North and South America.

Kochia Alata.—I observed hundreds of plants of this new species during 1918, and have found it in several new stations. I had not seen it before at Bloomington, Franklin County. It is from five to six feet tall there, in good soil. It is very hardy and was not harmed by the low temperature of Sept. 19, (24°) which injured *Kochia scoparia* greatly. The new species was in flower at the date, which is usually a tender stage, but it went on and matured its fruit as though nothing had happened. The membranaceous wings were scarcely visible at that date, but by the 26th of September they had become about one half the normal length. Its specific value can be detected from the car window when the eye is trained to it.

I should have stated that the utricle is strictly obovate and essentially the same as in *K. scoparia.* One change should be made in the description. I find a slight tendency to redden at maturity. About one plant in ten has the habit. I have word from the National Herbarium that Mr. Paul G. Standley says that it is nothing but *K. scoparia.* He does not trouble himself to state how a species can be described correctly in all the botanies as having the calyx developed into thickened triangular wings and still have broad membranaceous wings which are just the opposite. He does not explain why we have *K. scoparia* here at Red Cloud, Nebraska, in abundance as an escape and no trace of *K. alata* while the stations north and west are being overrun with the latter. Its weedy character separates it from *K. scoparia* as one more mark of specific difference. Stock also browse it with pleasure.—*J. M. Bates.*

ADDITIONAL DRUG PLANTS.—I am much surprised to see *Echinacea angustifolia* omitted from your list. The alcoholic tincture of the root is a well-known antidote for blood poisoning and snake bites and is used for both man and beast. It is sold in our Western drug stores and found in the Pharmacopeia by a medical friend of mine who had somehow missed it heretofore. It has been shipped to Philadelphia drug makers by the half-ton from Western Kansas and is very abundant in Nebraska in many dry localities. Various species of *Lycopus* should be found in the Pharmacopeia if they are not, as *L. communis,* which is dried and made into tea for grippe colds with excellent results. It contains a non-alkaloid bitter resembling quinine and has a similar effect.—*J. M. Bates, Red Cloud, Nebraska.* [Like many another "simple" the *Echinacea* mentioned is listed in the Pharmacopeia but not among the official drugs. The latest edition of this work says of the plant "Of doubtful therapeutic value."—*Ed.*]

LIVE-FOR-EVER-BLOOMING.—That common escape from gardens, the live-for-ever (*Sedum telephium* or *S. purpureum*) has a well deserved reputation for failing to blossom. In some years one may examine extensive colonies of it without finding a flower. This, however, is only another illustration of the fact that plants able to spread easily by vegetative means often are chary of flowers or fruits. A similar illustration is found in the potato which rarely blossoms and still more rarely sets seed. This year, plants of the live-for-ever in the editor's grounds have bloomed for the first time in five years.

OREGON CHENOPODIUMS.—In your note in the Feb. 1916 number you include New Zealand spinach among the Chenopodiaceae. If you mean *Tetragona expansa* I am inclined to feel that this is a *lapsus calami.* I am interested in this plant because I found it growing on ballast at Linton (a "first occurrence" for Oregon) and my understanding is that it belongs to the Aizoaceae, along with *Mesembryanthemum,* two species of which I found associated with it. All our Chenopodiums here in Western Oregon seem to be introduced. The most interesting one is the Australian *C. carinatum* which is beginning to appear in the Southwest. *C. Botrys,* not mentioned in Piper and Beattie's "Flora of the Northwest" is beginning to be abundant along the shores of the Willamette. Should you not have included this among the species of medicinal value. I remember that my grandmother used to set considerable store by it. I want to enter a mild protest against Mr. Saunders' statement that *C. Fremonti* is "abundant in Oregon". Howell does not mention it at all which is evidence enough that it was not common in his time. It is not known to occur on the western side of the Cascades. Perhaps Saunders based his statement on the Californis distribution.—*J. E. Nelson, Salem, Oregon.*

SPURRED BUTTERFLY PEA.—One of our most common and attractive wild flowers during the summer months is the spurred butterfly pea (*Bradburya Virginiana*), a slender climbing vine that grows in nearly all uncultivated fields and thickets. Very often it makes use of the dog fennel to hold its beautiful flowers up where they may be seen, and there are few more attractive combinations than these tall, feathery plumes of green, studded with large, purple, floral butterflies. The flowers are especially attractive on account of the large, orbicular standard, which is from one and a half to over two inches in diameter. It is slightely dished in the center toward the base, and this basin is white, bordered by darker streaks of purple. Sometimes the flowers are such a dark purple that the stripes on each side of the white spot do not show, but the white is very conspicuous, others are more of a lavender, and rarely, almost white. The wings and keel are folded together over the white spot, and are about half as long as the standard. One day I happened to be standing near some of these flowers when the bumblebees were making their morning calls, and was so fascinated with the operation that I never miss an opportunity to see it all over again. It reminded me of the work of some wonderful automatic machine, like the arm on a printing press that reaches over and removes the sheets of paper as they are printed. The bee alights on the purple carpet, walks over to the white mat, and under the point of the hood. As he goes under, the hood raises up in front, a long, curved, white arm reaches over and presses a golden brush against his back. Then as he backs out, the brush slides along his back for a short distance, is raised back out of sight in the hood, the hood drops back into place, and the bee is off to the next butterfly pea.—*W. M. Buswell, Barton, Fla.*

EDITORIAL

The editor's decision to spend two of the summer months in the desert was made so quickly that there was no time to apprise our subscribers of his intended absence or to make arrangements for the appearance of the magazine on its regular date. Though this number is late, we expect the November number to be on time, or but little delayed, and here take the opportunity to express our appreciation of those patient subscribers who have forborne to complain of the non-receipt of the issue.

* * *

It is certainly delightful to run across those naive bits of natural history, which the sapient editors of the gardening and household magazines use to ornament their columns. You couldn't sell one of these editors a throughly reliable account of any plant, but just get it up in the style of Aristotle or some of the other writers of antiquity and they fall for it at once. The following choice bit was culled from the columns of a magazine so eminent that publication in it carries much weight, but we are disposed to think that the editor was on his vacation, when the article was accepted. It is entitled "The Plant That Never Dies" and contains this astounding mis-information. "The florist told her that if she put the driedup ball of brown leaves in water it would blossom out into a fresh green plant in a day. Skeptically she did it and when the twenty-four hours were up, lo, the plant had blossomed, giving out a sweet, heavy, oriental odor. It brought this odor with it from the far-off Holy Land where it grew. It is another miracle of that miracle-land for it never dies. When it is out of water it rolls up into a dried-up ball and will keep that way for years until it is put into water again. It is called the resurrection plant". Most of our readers do not need to be told that this remarkable plant is one of the fernworts, *Selaginella lepidophylla*, that it is not a native of the Holy Land, that it never produces flowers, that it does not remain alive for years, that its unfolding is due to the hygroscopic nature of its stem and leaves, and that the heavy oriental odor was imparted to it by the fakir who sold it. Otherwise this delectable bit of botany is all right.

* * *

We are indebted to two departments of the National Government for illustrations in this issue. The frontispiece is from a photograph furnished by the U. S. Geological Survey Department of the Interior. It was taken by H. E. Gregory and appears in his paper on the "Geology of the Navajo Country". The mountain was photographed from a distance of ten miles and shows not only the character of the surrounding vegetation, but the clearness of the air that permitted a photograph from so great a distance. The illustration of the potato wart disease was kindly supplied by the Bureau of Plant Industry of the Department of Agriculture.

BOOKS AND WRITERS

Benjamin Gruenberg has issued a volume entitled " Elementary Biology" in which botany, zoology and human physiology are about equally blended. The book is attractively illustrated and clearly and forcefully written, but we fail to see how the physiology of man deserves the prominent place given it unless it is to meet some requirements of State laws on the subject. We are inclined to think that the young student could browse around in this book for a year or more and steadily add to his stock of information, though we doubt whether, at the end of this time, he would have a very clear idea of either botany or zoology. If the modern child is not to be instructed in the pure sciences, then we could wish him no better luck than to study from this book, provided some of the human physiology is eliminated. We are convinced, however, that a combination of the showy parts of botany and zoology will never be successfully substituted for courses in the sciences named. The book contains more than 500 pages and 250 illustrations and is published by Ginn & Co., Boston.

One of the first books to indicate an approaching change in the subject-matter of plant studies is Dr. Melville T. Cook's "Applied Economic Botany." This is a book for the beginner following the time honored sequence from seeds to flowers and fruits, but with most of the laboratory work based on projects connected with the farm and garden. Besides a discussion of the morphology and physiology of flowering plants, there are chapters on Gymnosperms and the lower forms of plant life from ferns to algae. The book ends with an account of the principal plant families of importance to man. In the opinion of the reviewer, this volume is a move in the right direction though it treats rather extensively of one phase of "applied" botany and practically omits mention of the drugs, dyes, textiles and other items of economic importance. We note a number of errors in the text which will probably be corrected in a subsequent edition. Lenticel (p 38) is incorrectly spelled, the underground stem of *Arisaema* is a corm and not a bulb, the fruit of the fig is a syconium, not synconium as many another botanist invariably spells it, and cane sugar (p. 107) has more than six atoms of carbon in its molecule. There is also noted a considerable survival of the systematic phase of botany with its abundant terminology including such words as endogenous and gamopetalous. The book contains 150 illustrations and is one of the Farm Life Texts series issued by the J. B. Lippincott Company of Philadelphia. The price is $1.60.

Seventy-nine different books on the grape have been issued in North America—more than all the books on other fruits put together—but U. P. Hedrick of the New York Agricultural Experiment Station comes forward with a new one which is made desirable by the many changes introduced through modern methods. The bulk of the volume is a carefully written account of everything that concerns the growing, marketing and utilization of grapes and is here mentioned only to be commended. One of the interesting features of the book is the list of the varieties of American grapes to which are added descriptions of each variety with an account of its origin, the stock from which it originated when known, and more or less useful information of a similar nature. There are about 60 species of grapes in the world, most of which are found in the Northern Hemisphere. Nearly half of these occur in North America and most of the others are found in China and Japan. The most important is the European wine grape which has been cultivated from time immemorial—Noah used to grow it—and which is still the leading grape for wine and raisin making. More than 2,000 varieties of American grapes have been reported. These have come principally from four species with the European grape, often more or less blended. The foremost American species, so far as the number of reported varieties is concerned, is *Vitis labrusca*, the common wild grape of the North-eastern States. The Concord and Catawba are typical of this species. *Vitis rotundifolia* has produced the Muscadine and Scuppernong, *V. aestivalis* is typified by the Delaware and *V. vulpina* by the Clinton. The book is one that modern grape growers can scarcely do without. It contains 450 pages and many illustrations and is published by the Mac millan Company of New York in their series of Rural Manuals edited by L. H. Bailey. The price is $2.50.

The peach is one of the oldest of cultivated fruits. Long before the Christian era all data regarding its native home had been lost. Theophrastus (300 B. C.) regarded it as a Persian plant, but recent investigations seem to indicate that it originally came from China. At any rate, peaches have been found growing wild in the forests of that country. Whatever its origin, the culture of the peach has spread to all lands where it will thrive. Many varieties are known, there being more than 450 in America. In a good year the United States produces more than thirty-six million bushels of peaches. These fruits are much more susceptible to cold than are our other orchard fruits. Its habit of early blooming is often the cause of crop failures, an unseasonable freeze killing all the blossoms. Peaches, therefore, are not always a paying crop in regions where the trees thrive and the location of peach orchards is a matter for careful study, especially in northern regions. Peach growing is a highly specialized industry. This makes more than usually desirable a book on the subject and H. P. Gould's volume on "Peach Growing" should be welcome to cultivators everywhere. The author is one of the pomologists of the United States Department of Agriculture and the value of the book is further guaranteed by the fact that it is one of the Rural Science Manuals edited by L. H. Bailey and issued by the Macmillan Company. The book contains more than 400 pages and numerous plates and costs $2.00

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JOLIET, ILL.

Vol. 25. No. 4 Whole Number 123

THE
AMERICAN BOTANIST

NOVEMBER, 1919

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JOLIET, ILLINOIS

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THE CRIMSON PRIMROSE—*Primula Parryi.*

THE AMERICAN BOTANIST

VOL. XXV. November, 1919 No. 4

The odorous wild grape clambers
Over the tumbling wall,
And through the autumnal quiet
The chestnuts open and fall.
Sharing time's freshness and fragrance,
Part of the earth's great soul,
Here man's spirit may ripen
To wisdom serene and whole.
—Bliss Carman.

ALPINE PRIMROSES

By MRS. BLANCHE H. SOTH.

TWO of the three species of Rocky Mountain primroses are alpine forms; that is, they grow only on the tops of the higher peaks above the tree line. The narrow-leaved primrose (*Primula angustifolia*) is a tiny plant that blooms in the grassy meadows early in the alpine summer while they are yet moist from the melting snow. It grows only two or three inches high and bears a single showy pink blossom that is faintly fragrant. So closely together do these little plants grow that the blossoms hide the grass and gravel and give their color to acres of steep meadow slopes during their brief blooming season.

A tall handsome plant is the crimson primrose (*Primula Parryi*). From a tuft of large, rather succulent, root leaves it sends up a spike, a foot or more high, of brilliant yellow-eyed, crimson-purple flowers. It grows in wet places among the rocks at high elevations and blooms later in the season than does the narrow-leaved primrose. It is a very noticeable plant, indeed, in that region of bare rocks and low growing vegetation. But he who runs to pluck it is doomed to disappointment and disgust for, in contrast to most alpine plants, it is very ill-smelling. As there are no insects up there to be attracted, this seems to be Nature's way of protecting so noticeable a plant from being eaten by animals. Thus it may safely flaunt its beauty though it has earned the name of ill-smelling primrose.

PLANT NAMES AND THEIR MEANINGS

By Willard N. Clute

THE names of plants have ever formed an important part of Botany. The collecting of plants and the running down of their names by the use of a "Key" was long considered the end and aim of plant studies and even now this amusement has not entirely ceased to interest the botanizer. The question as to the exact name each plant should bear, originated shortly after the Christian Era and still forms the subject for numerous acrimonious debates among the devotees of "the Amiable Science."

Meanwhile the meanings that lie in plant names have received scant attention. To be sure, nearly all botanical Manuals attempt to give the derivations of the generic names but apparently with only indifferent success, if we may judge from the diversity of derivations suggested. Since the generic names are usually taken from the Latin and Greek, a correct derivation ought ordinarily to be easy, but frequently it is far from being so. In the case of the common or vernacular names, the difficulties increase. There is no recognized authority upon which we may depend. Common names have been derived from all countries and from all languages. They have been given by philosopher and peasant, physician and farmer, civilian and savage, soldier and statesman. Learning has given us names derived from classic sources; ignorance has mispronounced and misapplied these names and coined others. As a result, the vernacular names present many puzzling problems which stand as a challenge to our ability, but the possibility of their solution adds zest to the study. Moreover, a wealth of tradition, poetry, folklore, fancy, custom, religion and other phases of life lie embedded in these names like jewels in the mine, and any extensive investigation is sure to be rewarded. Some of these names are older than the science of Botany itself; others are even now in the making.

It is manifestly impossible for any single individual to satisfactorily cover the whole field of plant names, but if any progress is to ensue, a beginning must be made, and it is purposed to set down here some observations on the subject which we trust will call out from others the additions, corrections, and further suggestions that the subject merits.

A good place to begin our studies is at that group of common, showy, and often poisonous species that long stood first in the botanical Manuals and is known as the Ranunculaceae. This word is only part of the title of the group. It should really be *Plantae Ranunculaceae;* that is, *Ranunculus*-like plants. As usually written, however, the names of plant families leave off the first word. Inquiring into the meaning of *Ranunculus,* we find that the word is derived from an animal rather than from a plant. *Rana* is the Latin word for a little frog and, because many plants of this group grow in marshy places where frogs abound, the old naturalist Pliny gave the name *Ranunculus* to one of the typical genera. From this name came the designation for the family and also for the order *Ranales* which includes, besides the Ranunculaceae, the Magnoliaceae, the Anonaceae, the Berberidaceae, the Lauraceae, and several others.

In any discussion of plant names it is unnecessary to devote much attention to the specific names. These are usually descriptive of plant parts and such other characters as size, habitat, color, abundance, and the like. Various proper names used are also self-explanatory. Some specific names, however, deserve mention, as for instance in *Clematis viorna* where the specific name comes from two Latin words meaning ornament of the wayside. *Ranunculus sceleratus* is of interest from an occasional mis-translation which makes it celery-leaved. The real meaning of *sceleratus* is acrid or biting. *Zanthoxylum apiifolium* may be properly translated celery-leaved for that is what the name really means.

Turning to the generic names, we find many of them dating back to periods earlier than the Christian Era. Some have been given in honor of heathen deities, others are the names of ancient plants entirely unrelated to the plants which now bear them, the titles having been misplaced through the vicissitudes of time or the carelessness of early writers, and still others are of such obscure derivation that the translations are at best mere guesses.

Paeonia, the genus of plants we now call peonies, was named for a mythological personage, the physician Paeon, who is reported to have used the plant in medicine and to have cured the god Pluto with it. Old fashioned folk call the plant, piny, perhaps with better authority than we have for calling it peony, for properly pronounced the generic name is *Pi-o-ne-a,* easily shortened to piny. The larkspur genus *Delphinium* is named for a fancied resemblance of the flowers to the classic figure of the dolphin (*Delpin.*)

Anemone is usually supposed to be derived from the Greek *anemos,* meaning the wind, but the latest editions of Gray's Manual says it is a corruption of *na-man* the Semitic name for Adonis "from whose blood the crimson-flowered Anemone of the ancients is said to have sprung." Our first derivation seems to be more in favor for it has given the vernacular name of windflower to several species. Wood's "Class-book of Botany" says that these plants were called anemones because many species love windy places. Whatever the derivation, it may be mentioned in passing that the accent should be placed on the third syllable making the word sound exactly like Annie Mony. Thus far this has been overlooked by those sticklers for the new way of pronouncing *Arbutus* and *Gladiolus*. *Anemonella,* the generic name for the rue anemone, is a diminutive of *Anemone*.

The authorities also fail to agree as to the derivation of *Clematis*. Wood says it is from the Greek *klema* a vine or tendril, Gray says it is a name given by Dioscorides to a climbing plant with long and lithe branches. As to *Adonis,* Wood says "Feigned to have sprung from the blood of Adonis when wounded by the boar" but Gray opines that "Adonis was a favorite of Venus and after death was changed to this flower."

The globe flower genus, *Trollius,* is another bone of contention. According to Wood it is derived from *Trollen* meaning golden. Britton's Manual derives it from *Trol,* round. Webster's Dictionary says it is from *Torolya,* the Hungarian name for the plant, and Gray explains it as from *Trollblume,* the German common name. *Troll,* it will be remembered, is the German name for a mischievous dwarf or fairy. Perhaps the flower is named for the troll! Anybody is at liberty to adopt whichever derivation seems to him most correct or to make one of his own. In any event, one can hardly look for accuracy in lesser writers when the authorities differ so markedly.

Diosocorides is responsible for the generic name *Thalictrum* applied to the meadow rue, which Wood says means "to be green." *Helleborus,* usually regarded as of unknown derivation, is said by the same author to come from two Greek words which mean "the food that causes death." The genus is well known to be poisonous. *Aquilegia* is derived from

Aquila, the eagle, in allusion to the spurs which suggest the talons of a bird of prey. *Aconitum* is reported to be derived from the Greek *Akoniton,* meaning without dust, because the plants grow in rocky places, while *Hydrastis* is assumed to come from the Greek word for water, though the translation does not go unchallenged.

The other genera of the Ranunculaceae are somewhat more easily interpreted. *Actaea* is the ancient name for the elder whose leaves the plants of this genus are said to resemble. *Cimicifuga* is from the Latin *cimex,* a bug, and *fugare* to drive away, accounting for the common name of bugbane. *Zanthorhiza* is the descriptive Greek for yellow root, and *Nigella* is the diminutive of *niger,* meaning black. *Coptis* means to cut, in allusion to the divided leaves. *Caltha,* according to Wood, is from the Greek for goblet, the flowers being like golden cups. Gray says it was the ancient Latin name for the common marigold which, however, does not necessarily invalidate the original derivation. *Myosurus* is, in Latin as it is in English, mousetail, being so called because the carpels are attached to a long slender axis. *Troutvetteria* is named for E. R. von Trautvetter. Gray says "an able Russian botanist" but Wood says "German" and the name looks it. *Hepatica* refers to the liver in the original Greek because of its leaves which are supposed to be shaped like the liver, and *Eranthis,* or the winter aconite, means spring flower. *Isopyrum* is the ancient name for some species of fumitory.

The number of vernacular names bestowed upon a given species depends in part upon its abundance, in part upon its conspicuousness, and in part upon its usefulness. Some may have as many as twenty common names and others lack a single one. It is interesting to note that the best known common names are nearly always generic; that is, they are applied to a number of species, instead of one, with, or without, qualifying adjectives. This is the case with *Ranunculus* where buttercup and crowfoot are common designations even when the flowers show no hint of butter color and the roundish and often undivided leaves could scarcely be likened to a crow's foot. Such adjectives as ditch, water, mountain, tall, dwarf, early, and the like are self explanatory as in the case of the specific names; in fact, they are very frequently literal translations of such names.

The names of obscure derivation are the ones of most interest. Take, for instance, the word knops in such terms as golden knops applied to several species of *Ranunculus*. This is archaic English for a flower-head and in all probability goes back to the Teutonic knopf or its equivalent, meaning a head, bud, or button. Spearwort, a generic term for several small species of *Ranunculus,* is derived from an Anglo-Saxon word meaning a spire or shoot just as we still say a "spear" of grass. In all probability the spears used in combat were similar though larger spears.

The three common species of *Ranunculus, R. acris, R. bulbosus,* and *R. repens,* naturally have the greatest number of common names. They might also be said to be joint owners of a number of names referring to their color, as yellow gowan, horse gold, gold balls, gold cups, gold weed, butter rose, butter cress, butter daisy, butter flower in addition to butter cup. Several of these terms may be applied with equal propriety to other species of the genus. The word gowan is now used in Scotland to indicate the daisy, but it once meant any kind of a flower or bud. When Burns wrote of "gowans fine," he doubtless meant wildflowers in general. Butter daisy is a different rendering of yellow gowan. The word rose is another term that once had a less restricted meaning than we allow it at present, as witness rock rose, Christmas rose, rose moss and rose of Jericho. Butter rose is simply a butter colored flower. In horse gold, the word horse implies coarse, common, or spurious. It is often thus employed in flower names, as horse-mint, and horse-radish.

The names blister flower, blister wort, blister plant and biting crowfoot are applied to several species noted for their acrid and biting juice, especially *R. sceleratus*, *R. bulbosus* and *R. acris*. The name of St. Anthony' turnip, applied to *R. bulbosus*, probably has the same suggestion. The bulbous base of the stem is not unlike a turnip in shape, and St. Anthony is the saint above all others for which hot and blistering things might properly be named. This species is also called St. Anthony's rape. *Ranunculus sceleratus* is called water celery and celery leaved crowfoot, but in reference to its leaves and not as a translation of the specific name. The worthless properties of this species have earned for it the name of cursed crowfoot, but it is apaprently not the only species cursed for *R. arvensis* bears the names of hell weed and devil's claws. To this species also belong starve acre and hunger weed. The plant is said to receive the last two appellations because when it is present in the field the crop will be short and the owner brought to want. Devil's claws quite likely refers to the way the plant lays hold on the field rather than to any particular thought of the devil. *R. repens* is called ram's claws though no ram we have ever seen had claws. Possibly the name is derived from the Icelandic ramr, meaning strong, in allusion to the way the species grasps the soil. Sitfast is another name applied to this plant whose hold on the soil makes it especially applicable.

Ranunculus ficaria is called figwort from the fig-like shape of its roots. It also bears the name of lesser celandine, the true celandine being a yellow-flowered plant of the poppy family. Another of its names, crain, is unmeaning enough until we discover that crain or cran is an ancient name for marsh, hence cranberry and perhaps crane, a storklike bird. *Ranunculus trichophyllus*, owing to its much divided leaves is known as water milfoil. The true milfoil is usually regarded as belonging to the yarrow genus (*Achillea*). Double forms of *R. acris* are sometimes known as bachelors' buttons, as are many other buttonlike flowers. Finally, cuckoo-buds applied to some species of *Ranunculus* finds authority in Shakespeare where

"Cuckoo buds of yellow hue
Do paint the meadow with delight."

A LITTLE-KNOWN BOTANIST

By J. E. Nelson.

LIKE every science and every branch of human knowledge, botany has its biographical side; but it occurs to relatively few to ask what manner of men these were whose work has come down to us—how they lived and spoke and worked, and what were the events of their life. Pure science is supposed to abstract this "personal equation," and to concern itself simply with the attained results. Yet to me, since I have not enjoyed the privilege of a strictly scientific training, and have never been able to lose sight of personal considerations, the personality of the great botanists has always been a source of the keenest interest. Prefixed to Gray's Manual, my first text-book, is a long list of the authors mentioned in the body of the work, with the accepted abbreviations of their names. Many beginning students seem never to consult this list at all, and many more use it in cold blood as they would a table of logarithms; but I have to confess that it has always exerted a profound fascination upon me, and has acted as a sort of standing challenge to find out more about these men than their mere names, or than a bare catalogue of their scientific and academic achievements. But in this ambition I have never met with much success, because the ordinary encyclopedia does not give this sort of data, and the sources from which any personal information might be drawn are both scanty and inaccessible. Yet I have never failed to pick up any scraps of a biographical nature that have come in my way, and have found them full of an absorbing interest.

It can usually be taken for granted that the life of any man who has attained any considerable degree of eminence will be marked by some notable triumph over adverse or difficult circumstances, and will therefore possess a certain dramatic quality. This is, of course, not a universal rule; some great men seem to be born with the proverbial silver spoon in the mouth, and to be wafted by favoring breezes along the placid way of uninterrupted success; but such favorites of fortune have not been numerous in the history of botany, and most of the great systematists have known what it was to contend with adversity.

A few facts came into my possession recenly that illustrate this in the case of one of those names that used to appeal to my youthful imagination by reason of its exotic strangeness. The unmistakeably Portuguese surname of Loureiro always provoked my lively curiosity. Portugal has never been prolific in men of science; and after her brief period of exploration and colonization in the time of Magellan (himself a Spaniard) has seemed to be withdrawn from the great currents of scientific activity. The usual works of reference contain no mention of Loureiro, and it is only recently, through the kindness of Miss Mary A. Day, Librarian of the Gray Herbarium, that I have been able to get hold of the few facts that are known about his life. The best account of him is to be found in Don Miguel Colmeiros' *La Botanica y los Botanicos de la Peninsula Hispano-Lusitana* (1858), from whose sonorous Castilian periods I have been able to extract the following information:

Juan Loureiro was born in Lisbon in the year 1715. He was educated by the Jesuits, and at an early age joined that order. They were then, as they have been always, a body of missionaries; and the young Loureiro, at the age of twenty, was sent to the distant shores of Cochin-China. This was long before the days of the French occupation, and the country was wild and savage, with a very unhealthful climate. Loureiro, who seems to have possessed all the adroitness and persuasiveness of his order, managed to place himself under the protection of the governing chiefs, who were interested in him because of his knowledge of medicine. He was named as a sort of director of physical and mathematical studies, and while not openly allowed to preach the Gospel, his efforts in that direction were connived at because of his usefulness as a physician.

Up to this time he had no knowledge of botany, but in the course of his medical practice, since he could not obtain European remedies, he found himself forced to have recourse to the native herbs that possessed healing virtues. This made it necessary to study plants, and he took up botany just as it was first taken up in civilized Europe, as an intensely practical study with a direct bearing on the needs of daily life. The task before him was most difficult; he was without training in botany, he was wholly isolated from the scientific world, and worst of all, he had no books. But he seems to have been endowed with infinite patience and persistence, and never to have wavered in his determination. He managed gradually to acquire a few books, and finally came into possession of the works of Linnaeus, who was only eight years older than Loureiro, and had begun his wonderful scientific career with the publication of his *Systema Naturae* in 1735, the same year in which Loureiro had left Portugal for the East. With the aid of these books, joined to an unusual keenness of observation and an indefatigable industry, he succeeded in the course of his thirty-six years' residence in Cochin-China in making himself familiar with a very large number of plants, many of which were entirely new. He collected assiduously not only in Cochin-China, but also in China proper, as for several years he resided in Canton and Macao. Many of his specimens he sent to the Royal Academy of Lisbon; when he was finally recalled to his native land, he took many others with him, and added to the number by collections in Cambodia, Bengal and Malabar, and spent three months on the island of Mozambique. After his return, he devoted himself to the preparation of his *Flora Cochinchinensis*, which appeared at Lisbon under the auspices of the Royal academy in 1790. This included descriptions not only of the plants of Cochin-China, but of the other couneries which he had visited, and was provided with keys for use as a manual. It was well received, and a second edition was brought out by Willdenow at Berlin in 1793.

Loureiro published a number of shorter botanical works, among them a treatise on cotton, another on cubeb, still another on "Transplanting Useful Trees from Remote Countries" (*La Trasplantacion de los Arboles Utiles de Paises Remotos*), and at the time of his death in 1796 was engaged on a "Natural and Civil History of Cochin-China," with maps and astronomical observations.

His herbarium remained in the possession of the Royal Academy at Lisbon, but a large part of it has since been transferred to the Museum of Natural History in Paris, and some specimens even to the British Museum.

Since the region of his botanical activity lies on the opposite side of the globe, we could hardly expect to find his name connected with our North American flora. No speecies established by him appear in Gray's Manual (7th edition), Chapman's Flora of the Southern States (3rd edition), Coulter and Nelson's New Manual of Rocky Mountain Botany, or Howell's Flora of Northwest America. But in Hillebrand's Flora of the Hawaiian Islands (1888), two genera are represented which were established by Loureiro: *Argyreia* (Convolvulaceae), an East Indian genus of twenty-four species, of which *A. tiliaefolia* Wight has found its way to the Islands, probably as an escape from early cultivation; and *Mazus*

(Scrophulariaceae), a small genus of tropical East Asia and Australia, represented in the Islands by *M. rugosus* Lour, apparently introduced as a weed from China.

Oddly enough, this last-named species, which is a great traveller, seems to have found its way to the Western shores of the United States. It has been collected recently by Mr. M. W. Gorman on mud-flats along the Williamette River in the city of Portland, Oregon, and seems to have established itself in considerable abundance. There is thus an additional reason why the name of Loureiro should be something more to us than an odd abbreviation in the front pages of our manuals.

THE BLOOMING OF PORTULACA

By NELL MCMURRAY.

AT dusk portulaca leaves all push up close to the thick stem. Early in the morning these fleshy spike-like leaves spread for the day while tinted points at the tip of the stems and branches tell us the number and color of the blossoms which we are to enjoy at midday. Visiting bees are apt to arrive and try to enter before they can. At nine o'clock perhaps one bud has loosened sufficiently for a first guest to crawl in; at ten o'clock the exceedingly bright corollas are all open. The petals are heart-shaped and of various shades of red, pink, yellow, and white. They may be pink with red stripes; they may be white with a purple spot at base of each; or white with green basal spots. The base of each petal is white, making an "eyed" corolla.

The stamens in the heart of the flower are ripe and full of pollen when the petals spread. The filaments are thread-like and red, pink, or white. A tiny brown bee is a persistent caller, and it clambers around and around the stamens apparently interested only in the yellow powder. The style extends a trifle beyond the stamens and is divided into five, six, or seven branches at its stigmatic tip. The branches cling together when the flower first opens, then spread and lean over the lowermost petal. An entering bee would likely alight there and that is the one a stigma wants to meet. At twelve o'clock the petals have begun to draw themselves up over the inside organs, for the stamens are now worn and bare. The stigmatic tips are recurved and studded with pollen grains. At one o'clock there is nothing to be seen but a withered bit of corolla. No wonder a bee is impatient about a portulaca's opening; its life is so fleeting—only for three hours.

If the day is half cloudy, the blooming lasts longer. Do the blooms linger to give the bee partners a chance to work? Bees are inclined to be slow and stupid when the sun is not shining. In drizzling rain the foliage spreads in its customary daytime manner but the pointed flower-buds refuse to open. If the next day is fair a double portion of flowers appear. Though each flower lasts for but a few hours many come every day and when one withers a bud for another pushes out beside it.

The faded calyx, corolla, and stamens may be pulled off like a cap, revealing a round greenish button with a slight point in its center. Presently the round lid drops off of the button and scores of small steel-blue seeds are ready to tumble to the ground. Under a lens each seed is found to be beset with short, blunt projections and reminds one of a warty caterpillar with its head tucked close to its body. Portulaca is very shallow rooted and easily pulled up with weeds that may spring up in the same soil.

DESERT PLACES MADE TO BLOOM

By Mrs. E. F. Rush.

THE prickly growths of the desert are not void of blossom. In the spring of the desert year, these leafless plants bring forth flowers that for beauty of color and outline, texture and fragrance, cannot be excelled by plants of the most carefully nurtured hot house forms. It is as if nature endeavored to "make good" by this lonely, leafless, patient denzen of the desert.

The prickly pear or Indian fig, a native of the desert or Great Plains of North America, is the most praiseworthy of this great plant family. The blossoms of yellow, and sometimes a cardinal red, are followed by a species of peculiar, pear-shaped, purple-colored fruit about as large as an egg. This fruit is edible, and forms an important adjunct to the culinary resources of the American Indian housewife.

In Mexico, the large, flat, prickly lobes or "leaves" of this plant are shaved of their thorns and shredded by the natives, the green shreds resembling string beans. When cooked and served in the same manner as the green bean, a novice could scarcely tell the difference between this cactus vegetable and the bean.

The Sahuaro, or giant Sahuaro, as the natives call it, grows to an unusual height and age in Southern Arizona, the one shown being approximately two hundred years old. The Sahuaro appears very clannish, preferring to grow in groups, In the moonlight these "groves" of Sahuaro look like an approaching army!

There are about 1000 species of Cactaceae, almost without exception natives of America. The group Cactus is to the plant kingdom what the camel or dromedary is to the animal kingdom. It thrives in dry and poverty stricken soil, where the rainfall is infrequent but occasionally torrential during the rainy season. This grotesque but unique division of the vegetable kingdom has been so fitted by nature that its members may store away vast quantities of water within their bodies of pulp and spines, thus enabling them to tide over any dry season.

THE HAUNTS OF A NATUARLIST

BY H. TULLSEN.

IT matters not how densely populated with human inhabitants a given locality in the rural districts may be, there are spots therein that are seldom—almost never—visited by man.

While being written the foregoing statement seemed absolutely sound, but a second thought informs us that to be made unassailable it must be qualified by the subordinate proposition, "unless the locality mentioned be the working-ground of a naturalist." The ordinary man, in passing to and fro in the performance of his daily tasks, takes the paths of least resistance and thus avoids the arduous and uninviting places, but the naturalist's vocation demands that he be practically ubiquitous and there are few spots, no matter how small and mean, or how forbidding and difficult of access in the neighborhood in which he sojourns, that occasionally do not see the face of man—at least of one. And very true it is that many a lonely, out-of-the-way nook holds mighty secrets that are revealed only to him that delights to delve into the penetralia of Nature—to worship at her shrines.

The true student of nature regards not a bunch of Trilliums, or violets, or bluebells, kept alive in a vase of water—pathetic, second-hand things—when he can enjoy the fellowship of Nature's children near to her heart and warmed by her life-blood. He goes to the fields and woods not to "pick flowers", in the ordinary sense of the phrase. To him such is sacrilege, just as truly as the destruction of a wren's nest, or the shooting of a robin.

Although we are most at home while delving into the quiet depths of a far-off thicket, or wandering after pipits and marsh-wrens through the swamp, yet we are sometimes wont to amuse ourselves by speculating as to how great a variety of wild life a person might manage to become acquainted with in case he were always to remain within the town's limits. It is without doubt true that civilization betters the conditions of life for many kinds of birds and other animals, and of plants, and that such favored beings are in consequence more abundant in the vicinity of man's habitations than in the unkempt wilds. Notice the vast numbers of birds in our grapevines and hedges, the armies of mice and voles in our fields and the myriads of weeds along our roadsides and in our gardens; and think, furthermore, of the countless beings of all sorts that are constantly becoming adapted to the new circumstances that the influences of settlement and civilization are establishing. Does not a little observation and reflection soon satisfy one that, as a whole, our fauna and flora are far from being on the road to extinction and that there is much for a naturalist to learn even amid the city's moil? But, nevertheless, the fact remains that virgin nature pleases best, and we may be sure that a stroll through woods and wastelands will never lose its charms.

My happy hunting-grounds, during boyhood and youth, were confined to a limited district in Knox County, Illinois, northwest of the state center. This region overlies the Coal Measures and the surface consists of consolidated deposits of glacial drift, loess, and alluvium. Here are prairie lands along whose water-courses are considerable growths of timber. Cornfields, clover and timothy meadows, woodland tracts and treeless slough-lands, separated from one another by osage orange hedges, wire fences, or, in a few pleasing instances still, by old, zigzag rail fences, indicating how Nature and man are administering the affairs of the world in this region.

The woods, it may be, are not so grand and imposing as those of some other portions of the country, but it is enough that they teem with life and that their autumn coloration, as I deem it, is unsurpassed. Here it is true, no lofty peaks rear their hoary heads, but, bathed in sunlight or capped with mist, appear the hills to invite many and many a ramble of exploration. The largest streams that I became acquainted with were mere brooks that oftimes became dry in summer, but I contend that one may learn to love such vulgar rivulets as truly as Thoreau loved his classic pond.

He whose wont it is to seek solitude delights to wander in the lowlands—represented here in Illinois by what are termed "bottoms." Perchance it is a broad, level tract, bordered on either side by tree-clad hills, while throughout its length flows, or rather drags, a sluggish, meandering brook a few inches deep and two or three feet wide, on the average, in summer, but capable, in spring of overflowing the entire space between the bases of the two lines of hills. Cow paths lead through the wilderness of weeds. Brush heaps, their forms revealed but not their substance, are overgrown with and overwhelmed by, climbing false buckwheat, Virginia creeper, moonseed, bindweed, Smilax and climbing bittersweet, while all around, the tangled Compositæ—those Anglo-Saxons of the vegetable world—obstruct and delay the few human feet that venture here to scar the ground. The chewinks, at one's approach, chirp and fly from the hidden brush piles to the adjacent hazel shrubs of the hills, while a startled marsh-wren, in its flight, follows the windings of the creek.

A place that the Illinois naturalist always delights in is the vicinity of an old coal-mine—not necessarily one that has been worked on a large scale, but rather such a one as was operated by one or two miners only, who performed their work and left nature undefiled. A simple tunnel we perceive, sloping into the side of a hill—and what we behold is all there is, for the labyrinth of chambers far back in the bowels of the earth has long since caved in. Long ago, after a brief period of operation, the mine was given up as unprofitable, or it became "worn out," and the green grass of years grows about its mouth, while from the dripping roof of the entrance the strong roots of forest trees are hanging. Perchance the forest gods dwell within the cave that echoes back the wood pewee's complaining call and mistake the grotto wrought by the hands of restless men for one of Nature's own.

It may be that the natural historian will find nothing of very great value or interest here in the way of fossils. But to sit upon this mossy bank and gaze upon that seam that marks where the layer of drift material rests unconformably upon the shale of the Carboniferous system, that mere line that represents untold and nameless ages—thus to sit and gaze and to reflect upon the roll of the mighty waves in the vast ocean of time, is well worth a whole library of ordinary lore. After a little while, however, we begin to look around us—the wailing cry of a great crested flycatcher arouses us out of our reverie—and we espy in a heap of crumbled limestone a number of small bead-like objects, also of lime, they are not common in the neighborhood of every mine, however, for frequently we search for them in vain. Concerning them, hereabouts at any rate and among children, there is an interesting piece of folk-lore. They are called "luck stones" and "lucky stones," and to find one or more will bring good fortune to the finder, so it is said. Very few, I opine, know what their nature really is. Some there are, who do not belong to the school of lucky stone philosophers, that consider them to be beads manufactured by the American aborigines and in this connection we recall "St. Cuthbert's Beads" in Sir Walter Scott's "Marmion," which were no other than these small, wheel shaped bodies before us. But he that has a mere smattering, even of paleontological knowledge, recognizes them as the remains of crinoids or "stone-lilies," representatives of an order of animals belonging to the class Echinodermata; of which order the present-day species are very few, while the fossil kinds are legion.

This subject of folk-lore as a scientific study is fascinating, though much we may deplore the fact that the legends and superstitions thereof are apt to retard human progress, in that there exist persons that will rely on the time-honored ex planations of ignorance rather that ascertain what science has to say. Here, for illustration, we have a class that from time immemorial have heard dragon-flies called "snake-feeders," and of so great a faith are such persons that on seeing one or more of these beautiful insects circling about over a pool, that they invariably exclaim,"There is a snake about here somewhere," and put themselves on their guard. But the dragon-flies are engaged in their legitimate business of hawking for mosquitoes and other small insects, an occupation little guessed at by ignorant observers, and the jointed Equisetum, these people say, will turn into a snake; to touch a toad will give warts; the "smoke" from a puff-ball, blown into the eyes, will cause blindness; and if a small bird flies against your window-pane and beats its wings, or an owl hoots in the trees above your house, especially for several consecutive evenings, death will shortly visit that dwelling—and so on, without end. It would appear that the field of natural history is a species of inferno, infested by all that is uncanny and uncouth. But it little becomes me to criticize others, for time was when I hesitated to approach a certain bank that the dragon-flies were passing over, to and fro, for fear of being stung!

During several years I made frequent observations upon the growth and succession of various species of plants on a forty-acre tract that had been cleared of its second-growth timber-covering of oaks, hickories, maples, poplars, hackberries, elms and a few other kinds of trees. I drew no important conclusions bearing upon the problems of ecology, it is true, but it was interesting to view the extreme fierceness of the war of existence in territory newly thrown open to a host of competitors for its possession—to contemplate in the sea of struggle the ebb and flow of battle.

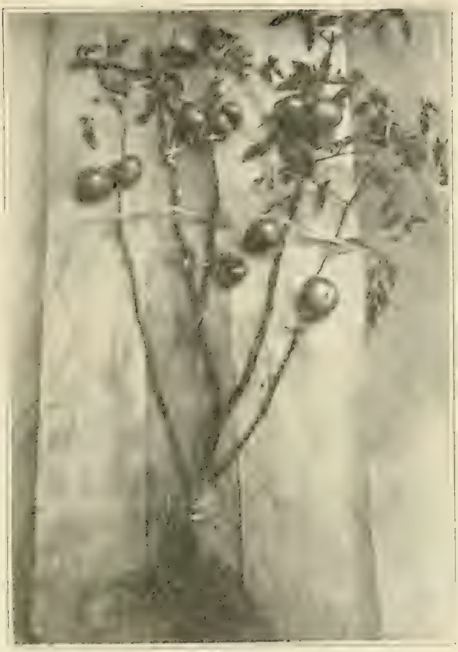
For a long time the hazel brush and the branches of the felled trees lay unburnt upon the ground and the vegetation was at no time greatly damaged by fire, or by roving herds of live-stock. From year to year as the shrubs and young trees became tall enough to cause trouble they were cut to the ground, so that a fair field was maintained for the herbaceous multitudes. Along the borders of a little springy stream Virginia creeper flourished in great profusion upon the heaps of boughs and until these were burnt or had undergone decay, this vine found conditions better suited to its mode of existence than before. Solomon's-seal (*Salomonia commutata*) likewise grew in abundance on the hillside near the stream, where the soil was rich and damp and its relative, the false spikenard (*Vagnera racemosa*) bore its company. Very close to the ditch and hence little or not at all inconvenienced by the deforesting of the land, grew the great Lobelia, tall bellflower, germander (*Teucrium canadense,*) and meadow-rue. Daisy fleabanes (*Erigeron annuus*—the sweet scabious —and *Erigeron ramosus*) I noticed at first growing for the most part where the openings among the trees formerly were, but in after years they spread more uniformly over the field Canada cinquefoil (*Potentilla canadensis*) was soon observed making great headway over the brush piles upon the hills and over the broken banks. On the south portion of the clearing, practically to the very foot of the green forest wall, this plant fairly carpeted the ground, but beyond the boundary line within the dense second-growth wood, how different was the view! Hardly a specimen of this and very few of any other herbaceous plants were to be seen. Ferns were among the few species that were distributed only along a deep ravine. Where this ravine traversed a corner of the area from which the timber had been cut they were thus left without their wonted shelter and in a season or two they disappeared. *Potentilla monspeliensis*, the rough cinquefoil, in a short time came to be abundant all over the higher ground. Climbing false buckwheat (*Polygonum scandens*), in summer and autumn was very conspicuous, being seen in nearly all parts of the clearing, trailing over the prostrate branches of the trees and shrubs.

About the latter part of July of the first summer, I noticed that Canada fleabane (*Erigeron candense*), hereabouts called "horse-tail," was spreading rapidly, particularly on the hillsides, along old paths and close to the old wagon-road that led through the forest that is now destroyed; in some places it stood so dense that the crowding rendered the plants sickly. The American pennyroyal, also, was abundant. Wild sunflowers (species of *Helianthus*), and *Silphium integrifolium* were conspicuous in the fall of the year. Yarrow, true to its pastoral nature and bringing visions of shepherds and flocks and the olden time, soon appeared everywhere on the hillsides and level places. *Galium concinnum,* a bedstraw, grew in all such places as afforded it grass or brush for support. White vervain was rare, while the blue and the hoary were much in evidence. On the higher levels, mainly, was found a Rudbeckia, or cone-flower.

Mullein (*Verbascum thapsus*), generally considered, was not very plentiful, but on the spots where the brush piles were burnt in autumn, this plant sprang up so thickly in the following spring that it was impossible to walk over such places without treading upon the rosettes of woolly leaves. Canada fleabane, Venus' looking-glass (*Specularia perfoliata*), and a blue-flowered speedwell likewise grew, the first in abundance, the last two sparsely, upon some of these fire-swept spaces.

Among species that were to be found in but one or a few small and isolated patches were false indigo (*Baptisia tinctoria*), smooth false foxglove (*Dasystoma virginica*), lousewort (*Pedicularis lanceolata*), Indian plantain (*Mesadenia artriplicifolia*), Painted-cup (*Castilleja coccinea*), Joe-Pye weed, dogbane, and pokeweed. While not of heavy growth in any particular place, the following were scattered over the entire cleared area: Spiderwort, *Lobelia leptostachys, Steironema ciliatum*, catnip, three-toothed cinquefoil (*Potentilla tridentata*), shrubby cinquefoil (*Potentilla fruticosa*), self-heal, wild strawberry, great ragweed and a species of spurge. Chiefest among such as were at first rare, but in after years increased greatly in numbers were horse-mint, mountain-mint (*Koellia virginiana*), Starry campion (*Silene stellata*), Culver's-physic, lamb's-quarters and the common ragweed (*Ambrosia artemisiaefolia*). Finally, along an ancient trail came May-weed, or dog-fennel, heralding the advance of a conquering civilization.

Such bare cataloguing of species may appear stupid and useless and perhaps it is so, but nevertheless I anticipate with pleasure going over this old hunting-ground of mine at some future time and comparing conditions as they then shall exist with those of the past. It will be good to note what plants, being unfitted to dwell in the open among such a host of competitors, has disappeared and likewise to observe what are the predominating forms—the "winners in Life's race."



TOMATO GRAFTED ON POTATO

H. E. Zimmerman.

ALL students of botany know that the potato and the tomato belong to the same family of plants. Though this is true it is not easy to graft one on the other. However, Mr. George H. Hursh, of Shiremanston, Pa., has succeeded in performing this botanical stunt. To produce such a result he got a late potato plant nicely started in a pot. When about ten inches high he cut it off eight inches above the ground and inserted therein a terminal shoot of a vigorous growing tomato plant, using a cleft graft about an inch and a half long for this purpose. After the scion was inserted the cleft was tied together and the whole wrapped with moist sphagnum moss until united. As a result of this union, half dozen fair sized potatoes grew on the roots and eleven medium sized tomatoes grew on the tomato stalk.

NOTE *and* COMMENT

FRAGRANCE OF CAMASSIA.—Regarding the odor of *Camassia* which formed the subject of a recent note, Prof. J. C. Nelson writes: "I am wholly unable to detect any odor in our very common *Camassia quamash* or in the closely related but less common *C. Leichtlinii*. As for *Ailanthus glandulosus*, the bad odor seems to be confined to the staminate flowers, but the bruised leaves of both forms exhale an odor that personally is far from pleasant." Fragrance in flowers is so variable that it would be hazardous to insist that any species is either fragrant or odorless. Fragrance may vary with the locality, the time of day, the amount of moisture in the air, the conditions of sunlight and shade, the season, and even with the individual. The actions of bees and butterflies indicate that all flowers may be fragrant to them. Among men, the individual sense of smell may differ, as we have pointed out in these pages: what one considers fragrant another may pronounce odorless. "When doctors disagree, who shall decide?"

SUGAR.—The present sugar shortage, or rather the strike of the sugar refiners, directs attention anew to sugar in all its forms. One of the interesting facts which possibly only a refiner can explain is why we are obliged to pay more for the raw brown sugar than for the same sugar after it is refined. The two principal sources of sugar in the United States are the sugar cane and the sugar beet. According to the chemist, cane sugar and beet sugar are in all ways identical, but the housekeeper insists that there is a difference, not only in sweetening power, but also in the keeping qualities of things sweetened. In canning, for instance, cane sugar is usually preferred. Although cane and beet sugar may be identical as regards the kind and number of the atoms which form their molecules, it is quite possible that the atoms may be differently arranged in each and thus give warrant for the claimed difference. Another important sweetener is glucose made from the starch of corn. This is used extensively in sweetening soft drinks, in candy-making, cooking and in canning. It can be produced much more cheaply than cane sugar but is only about half as sweet. It seldom comes to the table, but is quite as wholesome as the sugar ordinarily used and probably more easily digested and assimilated.

German Irises.—Certain ill-advised Americans, endeavoring to demonstrate their patriotism, are out with the suggestion that the German irises should be renamed. It may be recalled that during the war these same sentimental patriots wanted to call german measles, "liberty measles," apparently unwilling that even disagreeable things should bear German names. Overlooking for a moment, the warped psychology in the case of the measles, we may point out that the reason certain irises are called german irises is because they are derived from a species of Central Europe named *Iris Germanica*. This species was long ago named according to scientific usage which does not recognize sentiment as an excuse for changing names. We may call the flowers liberty irises if we choose, but the species will continue to be *Iris Germanica*. The popular appellations of plants may be changed at will, and doubtless many of the decorative plants with German names will be re-christened to facilitate sales on this side of the world. It is a foolish fad, however, to name plants after nobodies on either side of the Atlantic. The great men and women of the world may well have plants named in their honor, but in all such cases a single word is sufficient to indicate the one honored. When it becomes necessary to distinguish the one honored by a string of names as Mrs. John H. Smith, the practice becomes absurd. Are there so few poetic and euphonious words in our language that we have to resort for flower names to the Lizzies, Mamies, and Gerties in the head gardener's family? It would be well to frown on the practice of giving German names or the names of non-Germans to plants unless the ones for which they are named are already distinguished.

FLOWERS OF HEPATICA.—When a hepatica opens, the stamens are spread out stiffly with anthers against the bright sepals, turning their backs on the bunch of pistils in the middle and not at all interested in them. But the pistils have tiny points of yellow and are standing erect in a receptive manner. Presently the tips turn brown and the portion below begins to grow. Now it is the stamens' turn to arise and open their packets of pollen for the little bees. The sepals fade and fall; the stamens dry and drop; the three little green leaves draw themselves up over the pistils and protect them. Sometimes, however, they are deprived of this work for the pistils fail to grow.—*Nell McMurray, Clearfield, Pa.*

NAME OF PLANT WANTED.—A correspondent sends us for name a very familiar plant, but though so familiar we have been obliged to give it up and pass it along to our readers in the hope that someone may recognize it from its description and forward the name. The plant is one of the unbellifers and has long been a favorite border plant in old gardens. The leaves are ample and ternately divided and (what ought to make the identification easy) are blotched and bordered with white. It appears to be the commonest umbellifer grown for decorative purposes and doubtless some of our readers will recognize it.

PELORIA.—Since the publication, in the August number, of a so-called peloric foxglove, some question has arisen as to the exact definition of the term peloria. The name peloria was originated by Linnaeus and applied to a form of the common toad-flax (*Linaria vulgaris*) in which the terminal flowers had five spurs in place of the usual single spur. Asa Gray's definition, therefore, seems correct in that "an irregular flower becomes regular by the monstrous development of complementary irregularities." This is somewhat different from the definition usually given, that a peloric flower is one in which an irreglar flower returns to the regular condition. The peloric toad-flax is regular to be sure, but only by the addition of other irregularities. It is probable that in the beginning, the toad-flax lacked spurs and that these developed as the flower became zygomorphic or two-lipped. The flower illustrated by Prof. Nelson, therefore, is not true peloria, though DeVries calls it so in his "Origin of Species and Varieties by Mutation," and so does Goebel in his "Organography of Plants." The last mentioned form appears to be a combination of several plant abnormalities for each of which there has been coined a separate name. Harshberger, in his "Mycology and Plant Pathology," lists 119 such names. The growth of a new inflorescence from the center of the old one is known as *diaphysis*. Peloria, or what is commonly called such, is found also in *Gloxinia, Tropocolum, Lamium, Salvia, Scrophularia, Anterrhinum,* and various orchids. DeVries originated a peloric race of the toad-flax which came true from seeds.

Cure for Poison Ivy.—I have personal knowledge of the absolute and prompt cure of two severe cases of ivy poisoning through the use of the dry bark sold by druggists as Peruvian bark. This bark is very generally used for the washing of fabrics, especially black goods, and is also used for the cleansing of the hair and scalp. Shred the bark into small pieces, add boiling water and allow it to stand a while or, as a quick process, allow a few minutes of boiling. Apply with a soft cloth, as hot as can be borne, and as often as needed according to the severity of the case. If generally effective, this would be a better remedy than other plants suggested as more easily secured.—*Miss A. E. Stockton, San Jose, Calif.* [The soapy substance in the bark mentioned may quite likely act to neutralize the poisonous nature of the ivy (*Rhus toxicodendron*). Those disposed to try the remedy should be careful to make the druggist understand just what is wanted since the bark most frequently used for washing delicate fabrics is better known as soapbark. Peruvian bark is another name for the bark of the Cinchona tree from which quinine is obtained.—Ed.]

THE DAY FLOWER.—The day flower (*Commelina communis*) interests me because it has two kinds of petals and two kinds of stamens. Glance at the blososm and it seems to have two bright blue petals and a few yellow stamens which are held above a closed heart-shaped spathe. This is all true enough, but a closer look reveals more. There are three small whitish sepals. One very small whitish petal held below certainly does not seem to belong to the blue ones above. Three of the filaments are long and white and stretch down beyond that little white petal and at their tips are good plain anthers. Three other filaments are threadlike and blue and stand erect, and at their summits are useless showy organs, each reminding one of a flower with four small yellow petals and a brown dot at the heart. There is a pistil in the middle with a long style that droops over with the useful stamens. It is curious how the useless part stands up and demands attention while the essential part hangs low and is decidedly inconspicuous.—*Nell McMurray, Clearfield, Pa.* [The Commelina is said to perpetuate one of the botanical jokes of Linnaeus. There were three brothers Commelyn, so the story runs, two of whom were botanists. The two showy petals and one inconspicuous one suggested the Commelyns to Linnaeous, and hence the name. The *Bauhinias*, most of which have two-lobed leaves, are said to have been named for the two Bauhin brothers, but which is Caspar and which is John nobody seems to know.—*Ed.*]

The Rarity of Conopholis.—If I had to base my opinion as to the frequency of *Conopholis americana* on my own early experience, I should never have been inclined to regard it as "rare." While not as abundant as its near relative *Epifagus virginiana*, and somewhat more inclined to occur only in the neighborhood of oaks, it was by no means an uncommon plant in the hilly woods along the Ohio River in Boone County, Kentucky. One must never base his judgment as to the rarity of a plant, however, on observations limited to a single locality. For example, Gray's Manual refers to the teasel (*Dipsacus sylvestris*) as "rather rare," which in the locality mentioned above, it was one of the commonest and most pestiferous weeds. Particularly in the case of introduced plants, all attempts to indicate distribution over any but the most restricted area are likely to result in acute inaccuracy. In fact, these words "rare," "common," "frequent," etc., are very far from being capable of that strict definition which is supposed to characterize scientific terms. Mr. C. C. Deam, in the last edition of his Trees of Indiana, has made a praiseworthy attempt to give precision to such expressions by inventing a code based on the number of individuals per acre; but while it is possible to count the number of *trees* on an acre, such an undertaking in the case of herbaceous plants would hardly be feasible. Perhaps except in strictly local floras, it might be better to abandon the use of such words entirely, and thus eliminate what must always partake more or less of the "personal equation."—*J. C. Nelson, Salem, Oregon.* [It must be remembered, however, that a plant may be rare in a region because suitable conditions for growth are rare. Now that we know more about plant associations, we realize that if the particular association in which our plant grows is missing, it too will be missing. But when the association is present and the plant missing, it is time to mark it rare. There are a great many suitable places for growth within the range of *Conopholis* where the plant does not grow. Can the same be said of the spring beauty (*Claytonia*), or the wild blue phlox, or even the arbutus?—Ed.]

VARIATIONS IN CALYPSO.—While living at Vancouver, in Southern Washington, I greatly admired that dainty spring wild flower, *Calypso bulbosa*, which was so abundant in the dark woods beneath the Douglas Firs. However, it lacked one attraction to make its loveliness complete: it had no odor. Although I examined very many of the little orchids, and also had my friends do likewise, no fragrance could be detected. Among the wild flowers which I took with me, when I left Washington to make my home at Eugene, Oregon, was a pot containing a few *Calypso* corms. That winter I was surprised upon hearing my acquaintances describe, in glowing terms, the fragrance of the flower. I did not know what to think. The next spring, I eagerly sought for Oregon plants, and great was my delight, when I inhaled the rare spicy perfume which they really possess. Yet to myself and others, the specimens which bloomed in my flower pot from Washington were utterly lacking in perfume. The only outward difference, which I was able to observe, was that the Oregon flowers were somewhat more waxy and shiny in appearance. It would be interesting to know if any such variation has been noticed in the Eastern forms of that species.—*R. V. Bradshaw, Eugene, Oregon.*

FLOWERING OF WILD CUCUMBER.—Wild cucumber (*Echinocystis lobata*) is a spendthrift when it comes to making flowers, for the big clusters of creamy-white blossoms stand up in profusion in August. A bee with a leg entrapped in these blossoms attracted my attention, and after helping the insect to escape I discovered that the six petals are covered on the upper surface with minute hairs, and it is an easy place for a bee's bristly leg to catch. Each node of this vine bears a leaf, a tendril, a sterile flower-cluster and commonly one fertile flower. At the base of an opening flower cluster, in the axil of a three-branched tendril, is a small green pedicelled ball covered with weak bristles like a young chestnut bur. Soon a point comes from its tip and finally a flower of the same form as those above, but frequently larger. About five hundred staminate flowers are held aloft, while one pistillate flower droops beneath. In fruit this bristly ball becomes bladdery. When cut open it emits the scent of cucumber and four pumpkinlike seeds are revealed.—*Nell McMurray, Clearfield, Pa.* [It is probably familiar to many, though seldom if ever mentioned, that the fibro-vascular bundles of the wild cucumber are so arranged about the seeds that when separated from the surrounding pulp at maturity they form an object which resembles closely a capacious pair of trousers which are certainly as much like Dutchman's breeches as is the flower that bears this name. It will be recalled that the fibro-vascular bundles of another species of Cucurbitaceae is of commercial importance. This is the well-known vegetable sponge or dish-cloth obtained from a species of *Luffa.*—Ed.]

QUARANTINE 37.—In your issue of The American Botanist for May, I notice your editorial recommending that horticulturists should have directed their efforts toward establishing safe methods of importing plants instead of urging exclusion. Quarantine No. 37 to which you object provides specifically for the introduction in limited quantities of bulbs and other plants, commercial entries of which are prohibited. The purpose of this exception is to provide new varieties and necessary propagating stock of standard varieties in case supplies are not found within the continental United States.

These entries henceforth will be safeguarded by the highly developed inspection and quarantine service now organized by this department. It is impracticable to give this type of inspection to commercial importations. If you will carefully consider the quarantine No. 37 as issued and the regulations which have been established under this quarantine, I think you will agree that the agricultural, horticultural and floricultural needs of the country have been very carefully considered. The action of a considerable number of experienced nurserymen and florists in immediately undertaking plans for propagating much of the material hitherto imported indicates that there is little likelihood of long delay in the establishment of sources of ornamental and other plants.—*E. F. Kellerman, Member Federal Horticultural Board.* [No doubt the Federal Horticultural Board established its famous quarantine with the best of intentions, but we are far from convinced that its rules will keep pests of any kind out, so long as we have unrestricted commerce with other lands. The packing material in which many things come from Europe, is composed of the cheapest material obtainable; seeds, foods and raw materials for manufacture may include enough spores or seeds to start the trouble. Moreover, since Canada has no such quarantine, disease introduced there can spread to New York and New England as easily as it can spread from New York to Pennsylvania. Carefully inspected nursery stock should be practically free from disease or insect pests and should not, as we see it, be singled out for attack.—Ed.]

FRUITS OF APIOS TUBEROSA.—The groundnut (*Apios tuberosa*) has the reputation of seldom producing seeds. It belongs to that interesting group of plants which possess means for multiplying rapidly by vegetative means and apparently do not find fruiting imperative. Other instances of such plants may be found in the white potato, the lily-of-the-valley, and the houseleek. The fruits of the groundnut are usually of sufficient rarity to be novelties, but that the plant may fruit abundantly on occasion is shown by a bunch of the pods sent us by W. M. Buswell from Bartow, Florida. The pods are about four inches long and a quarter of an inch wide and contain half a dozen brownish seeds. Like most species of Leguminosae the groundnut pods split in halves at maturity after which each half twists spirally thus pushing out and scattering the seeds.

OUR DEPLETED FORESTS.—Time was when in many parts of America, timber was cut and burned to get rid of it, but that time has long passed. Now we are cutting more timber annually than is added to our forests by growth and unless something is done quickly it will be too late; our forests will disappear. Before the war, this country exported every year, nearly four thousand million board feet of lumber in addition to manufactured articles that used many millions more. The chief woods exported are white oak, walnut, hickory, whitewood, basswood, and yellow pine. The yellow pine is especially valuable since it is the source of the turpentine so extensively used. At the present rate of cutting, these timbers will be exhausted in from ten to twenty years. In view of this fact, it may be questioned whether it is wise to try to develop foreign markets for our timber. Government officials report that if we adopt a rational forest policy it will be possible in time to supply all our timber needs and to export more than we are now doing, but this is only in case we begin immediately to conserve.

EDITORIAL

The Secretary of Agriculture has recently issued an order permitting the shooting of meadow larks by certain persons in South Carolina "when the birds are committing, or about to commit, serious injury to sprouting grains." Provision is made, however, that the birds must not be shot half an hour before sunrise or half an hour before sunset. To the editor of this magazine, who is not especially interested in the slaughter of insectivorous birds, the new order is a bit puzzling. If meadow larks are really harmful, why protect them in their breeding grounds? Think what a lot of trouble and expense it makes for the South Carolinians! Not only are they put to great expense for powder, shot and guns, but they must also spend a lot of time chasing around with a heavy gun when they might be raising cotton. We are also anxious to know how the South Carolinian knows when a meadow lark is "about to commit" a crime. Do they shoot him on suspicion and hold an inquest afterwards, or do they really have some way of finding out what a bird is thinking about that is denied the rest of us? Possibly the birds are unable to entirely conceal a wicked gleam in their eyes when they are meditating mischief. And we would like to know, also, if there are any other offenses in South Carolina for which a bird may be shot at sunrise but which he is protected in committing half an hour before. Only a short time ago, the bobolink was put in the criminal class in the South and we predict that the robin's turn will come soon. These latter birds are sometimes said to get drunk on china-berries; why not shoot them at sunrise for ignoring the "dry" law? But returning to the meadowlark we would further inquire whether, in view of his meditating the destruction of grain in South Carolina, it would not be wise and patriotic to shoot him before he has a chance to make the Southward journey. Our Northern pot hunters would be more than willing to oblige; why pick on South Carolina?

* * *

In a press bulletin purporting to be sent out by the National Geographic Society of Washington, we find it stated that in New Zealand "there is a caterpillar which dies but to live again in the form of a plant which blossoms and goes to seed." This is another excellent illustration of "newspaper science," sometimes called by jealous botanists in other parts of the world "Washington Science." It is absurd to suppose that animals can turn into plants, barring such instances as cows being turned into the corn or pigs turned into clover. The slight basis of fact upon which the caterpillar article is built is simply this: certain fungi—not "plants which blossom and go to seed"—are noted for growing in the bodies of insect larvae. When once located in the living insect the plant body known as a sclerotium gradually takes the form of the insect and ultimately kills it. Later it sends up a spore-bearing structure to the surface and scatters its spores to the winds. But no insect ever becomes a plant.

* * *

A writer in *Park's Floral Magazine* for November refers to the common barberry as follows: "The common barberry was harmful to our national economy for it was the favorite harbor of the rusts which are so destructive to our grain crops. These experts tell us that to complete the cycle of its life from egg to moth, the organism responsible for the stem rust of wheat, oats, and barley must pass part of its life cycle in the common barberry bush." Probably this was not written by a government expert. Such persons, at least, ought to know that no rust can grow up to be a moth, but it sounds wonderfully like some of the statements these same experts have made regarding the barberry. That they are sometimes unable to distinguish the shrub they rave about was proved to us last spring when we found some of the harmless Japanese barberry in our grounds ticketed with their anathemas against its horrendous cousin.

* * *

The letter-head of the United States Geological Survey carries a line at the top which says, "If the Geological Survey has served you, it has simply done its duty and will take your appreciation for granted." This way of looking at a public office is highly gratifying in a day when even some branches of the Government service seems bent on charging all that the traffic will bear. The Department of Agriculture, for instance, is supposed to look after our agricultural interests, but it places a price on its publications that seem to us out of all proportion to their cost. Other publishers are glad to supply the public press with books for review when this will aid in spreading a knowledge of what they contain, but not so the Department of Agriculture. If you want some dinky little pamphlet from this department you must send ten or fifteen cents, "stamps not taken." "If the Geological Survey has served you it has simply done its duty." Sounds good to us. May the sentiment spread to other departments!

* * *

Referring to the naive bits of natural history printed in this department from time to time, Mr. George L. Moxley of Los Angeles writes: "Your note recalls to my mind a placard I noticed once in this city on a very choice plant of *Euphorbia splendens* which read, 'This very rare plant is called "the Thorn of Christ,' 'native of Jerusalem, of the Cactus family.' On the foregoing I commented in *Lorquinia* as follows: All of which would be interesting if it were true, and pointed out where it is not true which you will observe is in every statement."

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Volume XXVI.

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CONTENTS

ILLUSTRATED ARTICLES MARKED WITH A STAR (*).

Aegopodium podagraria variegata...... *L. B. Cushman* 13
Cleavers .... *Lucina H. Lumbard* 95
Color Variations in Flowers.......... *R. V. Bradshaw* 23
Desert Trumpet Flower, The....... *Willard N. Clute* *77
Flora, Perpetuating our Native,..... *F. W. Von Oven* 24
Generic Changes, Harmfulness of.................. 63
Grass, A Noteworthy,.................. *J. C. Nelson* *10
Honeysuckle, An Unknown,........ *Willard N. Clute* *17
Navajo Reservation, Flora of the,...... *Aven Nelson* 48, 187
Navajo Region, Notes on the,....... *Willard N. Clute* *39
New England in Autumn,...... *Manley B. Townsend* 135
Plant Diseases, The True Nature of,...... *A. A. Erz* 20
Plant Names and Their Meanings
.... *Willard N. Clute* 2, 57, 91, 116
Rare Ohio Plant Immigrant, An,........ *Carl Krebs* *1
Rare Plants of Oregon.............. *R. V. Bradshaw* 18
Rarest American Plant, The........ *Willard N. Clute* 127
Regeneration in Elodea and Ceratophyllum, Notes on
Comparative,..................... *N. M. Grier* 81
Roses, Christmas, ... *Mrs. Mary Earle Hardy* 125
Spring Beauty, The Alpine,..... *Mrs. Blanche H. Soth* *115
Toad Lily, The,.................... *Willard N. Clute* *139
Under Which Code?.................. *J. C. Nelson* 129
Wildflower Distribution in the West,
.... *Mrs. Blanche H. Soth* 14
Wildflowers of the Oregon Coast,.... *R. V. Bradshaw* 84

Wildflowers, Some Texas, ... *Mrs. D. S. Hackney* 19
Winter Flowers in Massachusetts, *Mrs. Inez P. Mayhew* 140
EDITORIAL 32, 72, 108, 148
BOOKS AND WRITERS......................36, 73, 109, 151

NOTE AND COMMENT

Amphihromy in Heather......106
Aster Florets, Color of........107
Bacteria, The Ancient 143
Berberis Aquifolia 64
Bee Hive, A Queer 97
Botany in the Schools 27
Buds of the Lilac 102
Code, The American 31
Color of Aster Florets 107
Color of Portulaca 101
Conopholis, Rarity of 29
Corn and the Rainfall.........142
Cotton and the Weather......146
Crab, New Form of...........144
Dandelion Species 96
Dasheens 30
Deserts, Cold and Dry 96
Double Flowers, Dominance of, 101
Eagle, Bald, Threatened, ...103
Flower-buds two years old, 29, 99
Flowers and Sex 68
Flowers, Double, Dominance of, 101
Flowers with Extra Parts 67
Flowers, Zygomorphic 103
Fruiting, Heat and 69
Heather, Amphicbromy in.....106
Honeysuckle, An Unknown 66
Indian Turnip in a New Role.. 99
Insect Powder 142
Lady-bugs, Mountain-climbing, 106
Leaves, The Veining of........104
Levulose Syrup 145
Lilac, Buds of the 102
Loureiro, More About 28
Lupines, Blue and Yellow.... 70
Marigold, Identity of 105
Martins, Botanizing 104
Pennyroyal, Meaning of ..100, 146
Peony Myths 68
Poison Ivy, Remedies for.....100
Poisonous Plant, Another.....141
Polypody, Gray, Vitality of...147
Portulaca, Color of 101
Roots, Length of 64
Rose Ayreshire, in Washington. 98
Roses, Proliferous 66
Seeds, Cash for 29
Sex, Flowers and 68
Species, Dandelion 96
Species, Microscopic 65
Veining of Leaves, The.......104
Water Cress Native...........144
Yeast, New Use for............102

Vol. 26. No. 1 Whole Number 124

THE AMERICAN BOTANIST

FEBRUARY, 1920

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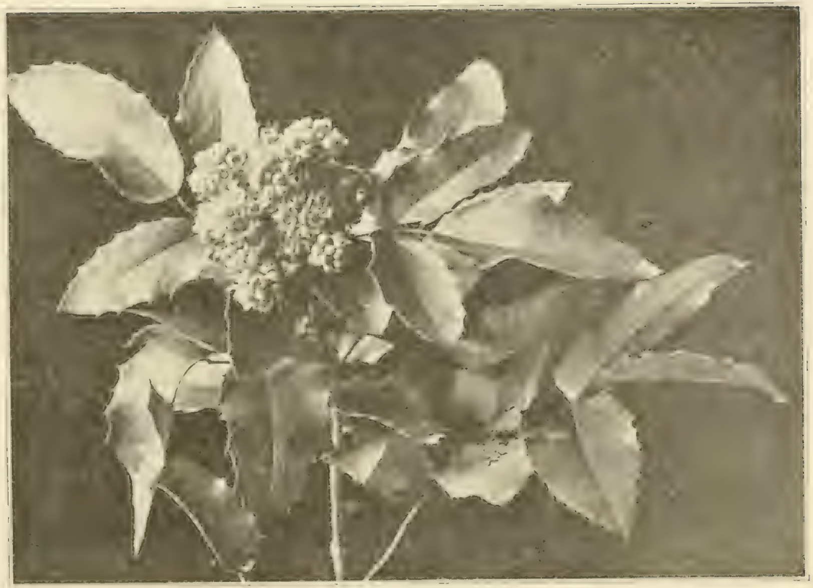

TRAILING MAHONIA—*Berberis aquifolia.*

THE AMERICAN BOTANIST

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There is no glory in star or blossom,
Till locked upon by a loving eye:
There is no fragrance in April breezes,
Till breathed with joy as they wander by.

—*Bryant.*

A RARE OHIO PLANT IMMIGRANT

BY CARL KREBS

SOME seventy-five years ago, a wealthy and eccentric farmer named Farnum planted a grove of pine trees (*Pinus strobus*) in the Cuyahoga valley of Ohio, which, owing to its shape, he called "God's Heart." Here he also maintained a zoological collection. Last fall a friend and myself resolved to explore this locality, but as we anticipated we found only a rank undergrowth of brambles in the grove. In exploring the surrounding country, however, we were surprised to come upon a colony of sprawling plants with bluish-black berries and shining leaves resembling holly.

The plants were unfamiliar to us but were later identified as the Oregon grape or trailing Mahonia (*Berberis aquifolia*) The following spring we visited the locality again and found the plants in blossom. The bright yellow of the flowers contrasted most beautifully with the sombre green of the holly-like leaves.

The home of the trailing mahonia is the Rocky Mountains and westward. We could find no record of its being found previously in Ohio. Judging from the locality, our specimens could not have been planted by man, and after speculating a great deal as to their origin, we concluded that the seeds must have been brought to the locality in the tousled fur of a herd of buffaloes which was maintained for a time by the eccentric Farnum.

The colony is twenty or thirty feet in circumference and has survived nicely, for on our third visit we again found an abundance of the beautiful yellow blossoms.

PLANT NAMES AND THEIR MEANINGS.—II.

RANUNCULACEAE

By Willard N. Clute.

AFTER publishing the first article in this series, I am convinced of the truth of the observation by a subscriber that "You have certainly tackled a thorny subject when you take up the etymology of botanical names." This fact, however, is far from discouraging. Enough new information has already been brought out to justify a continuance of the subject, and in any event, if readers will set me right when a mistake is made, we shall get nearer to the truth than anybody else has yet done. Not infrequently the mistakes made are not original, but are due to an unsuspicious following of those commonly regarded as authorities. Take *sceleratus*, for instance, which in the former article was rendered as "acrid or biting." Prof. J. C. Nelson points out that the real meaning is "cursed" and the common name, therefore is a correct translation of the scientific. I had previously published this identical translation in the *American Botanist*, but on consulting Zimmer's "Dictionary of Plant Names" found it rendered "acrid or biting" and so fell into the error. With reference to other names, it may be noted that *Rana* means simply a frog, as every biologist ought to know; it is *Ranun-*

culus that means little frog. The derivation of *Thalictrum* has also been challenged. Gray says *Thalictrum* is "a Greek name for an unknown plant," but Bailey's "Cyclopedia of American Horticulture" says it is from *thallo,* "to grow," while Wood's "to be green" is not far from the same idea. Prof. Nelson notes that the word thallus is probably derived from the same word as *Thalictrum. Aconitum,* according to Pliny, is from *an akonais* meaning "on sharp rocks." This is scarcely more illuminating than our original derivation. Prof. Nelson suggests that *Hepatica* means liver-colored and refers to the color of the underside of the leaves. In this he has all the Manual-makers against him, some even pointing out that the lobed leaves resemble the lobing of the liver; but the dictionaries all agree that hepatica means exactly what Prof. Nelson says it does!

We may now proceed to the common names for other species of Ranunculaceae. Our single species of *Hydrastis* has at least fourteen common names, nearly all of which refer to the color of the root. Those most worthy of noting are yellow-root, turmeric-root, orange root, yellow Indian paint, Indian dye, Indian turmeric, golden seal, yellow seal, and yellow puccoon. It will be remembered that turmeric is the yellow powder, derived from *Curcuma longa,* which is used in curry powders and we thus account not only for two of the names in the list but for Indian curcuma as well. We are at a loss, however, to account for the use of the word seal in some of the combinations. Puccoon is an Indian name given to a number of plants with striking colors. The bloodroot is known as red puccoon and some of the *Lithospermums* are known as yellow puccoons. Eye balm, eye-root, yellow-eye, and ice-root, the latter manifestly a corruption of eye-root, are due to the fact that the Indians were reputed to use a decoction of this plant for diseases of the eye. Ground raspberry is a most descriptive term for the deep red, but inedible berry which the plant bears.

It was inevitable that the cheerful yellow blossoms of *Caltha palustris*, appearing as they do among the early flowers of spring, should acquire a large number of appellations in the vernacular. Some of these are clearly due to a confusion of the blossoms with those of other plants as in such names as meadow buttercup, crowfoot, and cow lily, the latter commonly used for the yellow pond lily. Meadow gowan means simply meadow flower, and water gowan is of the same nature, while coltsfoot refers to the shape of the leaves. The best known common name, marsh marigold, comes down to us from the time when the generic name, *Caltha*, was used to designate the pot marigold. Marigold, itself, is really Marygold and dedicated to the Virgin Mary. I am at a loss to discover the signifiance of the term blob, applied to this plant in such combinations as may-blobs and horse-blobs. One meaning of blob is a splash of color, but that the flower name is derived from this is simply conjecture. Cowslip is a common name in America for our plant, though it is only remotely related to the true cowslip or primrose. The English cowslip is also a yellow-flowered species and our plant would be easily mistaken for it by the ignorant. It may be questioned whether bull-flower and bull's-eyes are from the same source as cowslip. Hilderic Friend derives the first from pool flower, and perhaps bull-rush may likewise be pool rush! Crazy Bet, and drunkards, are English names which allude to the ancient belief that the smell of these flowers caused insanity or at least deprived one of his senses. Could meadow-bout, and boots, also be derived from drinking bouts? Gools is probably a corruption of golds, and water goggles may be from the same source, but who can account for water dragon and capers? King's cup doubtless allude to the large golden flowers, as soldier's buttons does to their color.

That the more conspicuous flowers have the greatest number of common names is especially true of the early flowers, which, coming at the end of winter, attract the attention of many who later in the season pass even more showy flowers without a thought. The hepaticas, however, have failed to receive a name by which they are generally known. Liverwort, one of the oldest, is seldom used, possibly because there is a group of flowerless plants, near ralatives of the mosses, that bear the name. Wood attempts to distinguish between the two by calling our plant noble liverwort. Livermoss is clearly a misapplication of names. Three-leaved liverwort, golden trefoil, heart-leaved liverwort, ivy flower, liver leaf, and herb Trinity are all allusions to the three-lobed leaves. Apparently any plant with three-lobed leaves may to be connected with the Trinity. The case of the oxalis and shamrock are illustrations. The name of spring beauty seems by common consent to belong to *Claytonia Virginica* and its allies, but it is very frequently applied to our plant by the unbotanical. The poetic appellation, squirrel cups, was suggested by John Burroughs, but it does not seem to have been taken up by any but the book-makers. Like many another early flower, our plant is also called Mayflower. Crystal wort is the only name for this plant that fails of an explanation.

The species of *Anemone* and *Anemonella* are called windflowers apparently for no better reason than that the generic name is said to have reference to the wind. If it should turn out that Gray's definition of the generic name is the correct one, the wind will have been very effectually taken out of their sails. The rue anemone is so called because its leaves suggest those of the rue (*Ruta graveolens.*) With other species it shares the name of Mayflower. The species of *Anemone* most frequently called windflower is doubtless *A. nemorosa*, or, as the recent Manuals have it, *A. quinquefolia*. This species, or one almost like it, is common in Europe and is regarded as the true *A. nemorosa*. Since wood anemone is merely a translation of the specific name, it would be logical for us now to abandon the term since the specific name for our plant has been changed, but we seem quite disinclined to do so. Wood anemone is a name most appropriate for our species. The plant is also known as nightcaps and snowdrops from the appearance of the flowers. It is very evident that the terms wild cucumber and nimble-weed applied to this plant are mere misnomers. Nimbleweed, however, appears to be a corruption of thimble-weed, a name given to *Anemone cylindrica* and *A. Virginica*. Applied to these plants it is of some significance, since the heads of fruit have a decided resemblance to a thimble. In the mouths of the unobservant, the same name becomes tumble-weed.

Anemone pulsatilla, is one of the most widespread members of its genus and naturally leads its congeners in the matter of names in the vernacular. The commonest appellation is pasque-flower which means simply Easter-flower. The plant is also known as Easter--flower, wind-flower, and May-flower. The names of wild crocus, blue tulip, and rock lily are evidently due to fancied resemblances of the flower to other species, while headache-plant and hartshorn-plant refer to the use of this species in medicine. The term gosling alludes to the abundant hairs with which the plant is clothed and prairie smoke might be due either to the hairy leaves or to the smokelike effect produced when a colony of flowers are seen from a distance. Lion's-beard has reference to the fuzzy heads of fruit, April fools to their early blooming, but why does the plant bear the name of cat's eye and badger?

The conspicuous fruits of species of *Actaea* have given rise to a number of their vernacular names. The commonest one, given to both of our native species, is baneberry, because of their reputed poisonous properties. The names of poison-berry and snake-berry, applied to *A. rubra*, are additional names suggestive of the idea. Cohosh is another term shared by the two species. *Actaea rubra* is red cohosh or black cohosh, and *A. alba* is white cohosh or blue cohosh. The true black cohosh, is supposed to be *Cimicifuga,* while blue cohosh is regarded as being properly the *Caulophyllum*. The word cohosh is of Indian origin and without more evidence as to its meaning, the proper distribution of these plant names cannot be made. Among other names, coral berry and red-berry naturally belong to *A. rubra*, while white beads, white-berry, and necklace-weed are claimed by *A. alba*. The fruits are too evanescent to be used as beads, but they are sufficiently beadlike in appearance to suggest these names. Doll's eyes is another peculiarly descriptive name for *A. alba*. Both of our species bear the name of snakeroot, and *A. rubra* is further distinguished as rattlesnake herb and toad-root. Possibly these names are due to a mistake of these plants for *Cimicifuga*. Rattlesnake herb may have been given the plants through mistaking them for the rattlesnake fern (*Botrychium Virginianum*) which they resemble much in appearance. The fact that *A. rubra* is also called grape-wort lends color to this suggestion, since other species of *Botrychium* are called grape-ferns. The red fruits may have suggested this name, but they are far from being grapelike. Herb Christopher applied to these and many other plants is without obvious meaning.

Bugbane, a direct translation of *Cimicifuga*, is the common name of that group of plants which is also known as black cohosh and black snakeroot. These terms have been sufficiently discussed under *Actaea*. Species of *Cimicifuga* are also called rattle-weed, rattle-snakeroot, rattle top, and rattle-root. Possibly the harmless seed-pods, shaking in the wintry wind, have given rise by association to the idea of snakes, and, through a similarity in appearance, the noxious reputation has been passed on to the *Actaeas*. Such things have happened before now in human affairs.

Though the generic name *Aquilegia* is usually derived from *Aquila*, the eagle, the best known common name is a direct refutation of the idea, for columbine is derived from a word meaning dove. The derivation depends, perhaps, upon the disposition of the observer. Some see in the five spurred petals, the talons of a bird of prey; others see only a number of doves, billing and cooing. Honeysuckle, by all accounts, is wrongly applied to this plant, and yet it is about as commonly used as columbine. The conspicuous, nectar-bearing spurs make honeysuckle irresistable. Rock bells is a very appropriation name for *A. Canadensis,* since it loves to grow on rocks, while meeting-houses is an extension of the idea of bells in a belfrey. Cluckies seems meaningless until we learn that in Pennsylvania, at least, a setting hen is known as an "old cluck." Our doves have here turned to chickens! Jack-in-trousers, however, is unintelligible to the writer. The European *Aquilegia vulgaris* is known as blue-bells. Another name cock's foot refers to the shape of the leaves, but snapdragon, capon's tail, and ladies shoes seem mere fanciful applications. If they have any relation to the plant in question, we fail to see it.

Our single species of *Trautvetteria* is known as false bugbane from its general resemblance to *Cimicifuga.* Among other plants with a limited number of common names are the species of *Delphinium,* universally called larkspurs from the spurred sepal; *Myosurus minima,* known as mousetail from the fruiting axis like a mouse's tail; and *Helleborus viridis* called green hellebore, a translation of the scientific name. This latter species is sometimes called Christmas rose, but this title properly belongs to *H. niger* of Europe. Winter aconite is a translation of *Eranthis hyemalis.* This plant, blooming early in the year, has also received the name of Christmas flower. Wolf's bane and Hellebore refer to its reputed poisonous properties. Practically all of the names of *Eranthis* are more justly the property of the true aconite (*Aconitum napellus*) of Europe. This plant is also regarded as the true wolf's bane. Monk's hood is an additional name in allusion to the shape of the flowers. *Adonis autumnalis* is called pheasant's eye and red morocco, the latter in reference to the dark-red petals. Chamomile is from a fancied resemblance of this plant to the true chamomile (*Anthemis nobilis*) of

Europe. The slender yellow roots of *Coptis trifolia* has given it the name of gold-thread and yellow-root, while mouthroot and canker-root indicate the use of the plant for the cure of sore mouths.

The species of *Thalictrum* are not overburdened with names in the vernacular. Meadow rue given to most of the species, is without doubt applied from the resemblance of the plants to the real rue. Poor man's rhubarb is probably a variant due to ignorance. Feathered columbine suggests the numerous stamens and carpels as well as the columbine-like leaves. Silver-weed, quicksilver-weed, and shining grass alludes to the silvery appearance of the leaves when plunged under water. Musquash-weed is unmeaning unless it refers to the place in which some species grow. In the same category is rattlesnake bite. Celandine is clearly a misnomer.

Clematis Virginina bears off the honors for a multiplicity of common names among the species of *Clematis*. The most appropriate is virgin's bower, often supposed to indicate a dedication to the Virgin Mary, but in reality named virgin's bower by Gerarde several centuries ago because its clustering stems are likely to form bowers fit for maidens. Traveler's joy is an English name deserving of a wider use, while love-vine, if it have any significance at all probably alludes to the plants clinging to other plants after the manner of the dodder to which the name more properly belongs. Wild hops seems due to mistaking this for the true hop. Woodbine, often used for the plant, is more often applied to a species of *Ampelopsis*. Devil's hair and devil's thread have reference to the feathery fruits, though why the devil enters the combination is a mystery. Certain species of the *Clematis* genus, often segregated under the generic name *Viorna*, are generally called leather-flowers from the thick and firm sepals. *Clematis crispa* is sometimes known as blue-bell, blue jessamine, and curl-flower clematis. Whether the last mentioned refers to the sepals which curl back on opening, or whether the curls indicated are the feathery fruits it is hard to decide. *Clematis ochroleuca*, however, is called curly heads which may throw some light on the subject. *Clematis ligustrina*, the Western form of our Eastern virgin's bower is known as windflower for no special reason, apparently and *C. Americana* is called purple virgin's bower and mountain clematis.

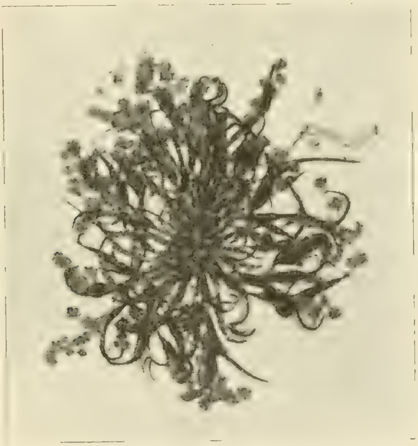
[Additional names, corrections and further observations on this list are desired. In the next issue, the names of the Rosaceae will receive attention.—Ed.]

A NOTEWORTHY GRASS

By J. C. Nelson

PERHAPS some of the readers of *The Botanist* who have never seen *Coleanthus subtilis*, but have been sufficiently impressed by the record of its eccentric distribution to wonder what it looks like, might be interested to see a recent photograph of this elusive little grass. Its occurrence in the United States seems to be confined to the lower Columbia Valley in Washington and Oregon, where it appears to have been first observed by Thomas Howell on Sauvies Island at the mouth of the Willamette in October, 1875. He collected it again at the same locality in September, 1881 and October, 1883. Mrs. Barrett found it at Hood River, Oregon in 1884, and Mr. W. N. Suksdorf at White Salmon, Washington in 1880 and near Bingen in October, 1881. Since these early collections it seems to have largely escaped notice—which is not remarkable when we consider that it is confined to the low mud-flats along the river, which do not become exposed and ready to support much vegetation until late in the fall. The casual observer would never see it at all; it is one of the tiniest of grasses, its isolated moss-like tufts (rarely more than 8 cm. in diameter) flattening themselves closely against the surface of the mud. I had the good fortune to stumble upon several specimens on the shore of Hayden Island, opposite Vancouver, Washington, on October 11, 1919, while engaged in a search along the shore of the Columbia for another species of the mud-flats—*Limosella aquatica.* The grass has a few-flowered umbel-like panicle, usually not over 2 cm. long, often partly included in the dilated upper sheath, and the tiny flowers are entirely destitute of glumes.

The genus belongs to the tribe Agrostideae, and its nearest relative with us among the better-known grasses is probably *Alopecurus,* although the arctic-circumpolar genus *Phippsia*, which extends within our limits to the alpine summits of the Rockies, and which is also a dwarf, seems to belong very near it.



COLEANTHUS SUBTILIS—*Natural size*

Whether *Coleanthus* is to be regarded as indigenous or introduced along the Columbia is a question that may never be satisfactorily settled. Probably no known grass has a more eccentric recorded range. Originally described from the mountains of Bohemia in 1816, it has been found also in lower Austria, Moravia, the Tryrol, France, Norway, and the Amur region of Siberia. It is so inconspicuous, however, that it may easily have escaped notice in intervening regions. Since it is confined to the muddy shores of rivers, ponds and lakes, it would not be very apt to become associated with cultivated plants or transported with them; but the small seeds might possibly become attached to the feet of water-birds, and in this way be carried for considerable distances. Most modern writers on grasses seem to incline to the view that it is introduced with us; but personally I see no valid reason why it should not be regarded as a cosmopolite, like the *Limosella* with which it is so closely associated along the Columbia. Hackel, who treats the grasses in Engler & Prantl's *Naturliche Pflanzenfamilien*, evidently regarded it as indigenous in the United States, for after enumerating the other regions in which it occurs, he adds, "Oregon," and remarks: "Distribution noteworthy." An excellent figure of the grass, although showing it somewhat more upright than it occurs here, is found in the Nat. Pflanzenfam. II. *2*, 49. The specimens figured above was photographed by my friend Mr. Herman Clark from a dried plant, collected on Hayden Island on the date mentioned above, and measures *7* cm. in its widest diameter. This specimen (my no. 2944) has been deposited in the herbarium of Willamette University at Salem, Orgeon, and duplicates have been exchanged with several of the larger herbaria.

AEGOPODIUM PODAGRARIA VARIEGATA

By L. B. Cushman

IN the issue of *The American Botanist* for November, 1919, you have an item headed "Name of Plant Wanted." In your description of it you say it is an umbellifer, a favorite border plant in old gardens, leaves ample, ternately divided, blotched and bordered with white, appears to be the commonest umbellifer grown for decorative purposes. Your plant is evidently *Aegopodium podagraria variegata*. For common names, it has bishop's weed and goutweed. Some writers attribute the latter name to the supposition that it might have formerly been used as a cure for gout. Others say the generic name comes from two Greek words, one meaning goat and the other a little foot. The capsule or seed-pod pictured in Gray surely looks much like the cloven foot of a goat. The name bishop's weed came from the fact that the capsule, with its persistent recurved calyx lobes has much the appearance of a bishop's miter or cap.

To me, goutweed is too homely a name to saddle on to such a pretty plant. I prefer bishop's weed though I usually call it by its generic name. One variety of this plant has leaves that are entirely green. I regard the one with varigated leaves as handsomer. Plant the two kinds near each other and they will cross.

The *Aegopodium* is an exotic from Europe. It is a hardy perennial and spreads rapidly by its creeping roots. Few decorative plants will do as well in the shade. Its chief beauty lies in its leaves which attain a height of ten or twelve inches The seed stalks get higher, but they should be clipped off as the flowers are inconspicuous and the stalks detract from the looks of the plant. Though this plant is grown somewhat extensively, most people who have it are unable to give its name. I have heard it erroneously called snow on the mountain. So far as I know, the plant is not listed in the wildflower books except in some of the Botanies, presumably for the reason that it has not escaped from cultivation sufficiently to be called a wild flower.

[Other readers note that the plant is apt to become a nuisance if allowed to spread into beds of perennials, as its underground suckers are difficult to eradicate. As to one of the common names for the plant, one might as reasonably make it goat weed as goutweed, for while the generic name signifies goat-foot, the specific indicates that it is connected with the gout. In Europe the plant is known as ash-plant and Herb Gerard. One wonders whether this Gerard was the bishop who took the plant under his protection.—Ed.]

WILDFLOWER DISTRIBUTION IN THE WEST

By Mrs. Blanche H. Soth.

SUCH articles as H. Tullsen's "The Haunts of a Naturalist" in the November *Botanist* are of the greatest value to me. The lists of species conveyed a definite idea of just how that patch of nature looked. While it may be that one discovers no new or startling facts by such chronicling, no one needs to journey to foreign lands to do original work in botany. If anyone thinks that the work has all been done, let him try to obtain some definite information about the plants of his own locality. What is needed now is just such study of small areas as this article records by resident botanists who can revisit definite marked areas year after year. If a hundred such records of adjoining counties could be made, what a wealth of information would be available.

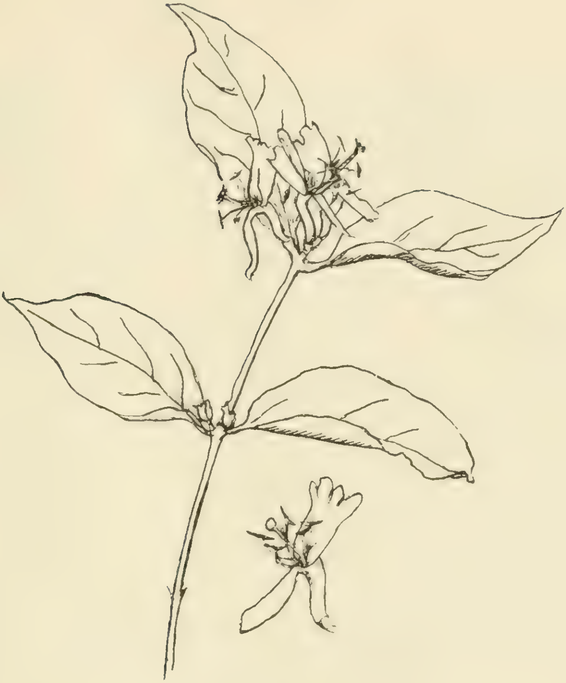
I grew up and went to school in Central Iowa, then came west and have since lived in several interesting localities, among them the top of Pike's peak. I have amused myself by collecting and pressing every different plant I have found, and have kept an accurate list of those from each locality. These lists of names reveal many interesting facts.

East of the mountain, where the trails and creeks meet the railroads and highways from the East, is a meeting ground for many species from widely separated places. In little willow and cottonwood copses, one will often find rare plants from the mountains,—gilias, columbines, polemoniums, phacelias, asters, western glow, beard-tongue, and many more. On the mesa lands above, troops the hosts of plains plants,—yucca, prickly pear, false mallow, milk vetch, bush morning-glory, and members of the primrose family. There were no trees on the plains along the streams until the annual fires set by the Indians ended. Then the trees crept up from the valleys, the cane grass overcame the buffalo grass, and was itself succeeded by a mat of blue-stem which remained until the plow came. Weeds followed the wagons along the road to Oregon which is still marked by a yellow blaze of sunflowers, typical of the gold that lured the caravans which stamped it on the prairie. Lance-leaved sage, brittle-weed, and wild tomato dispute the territory in vegetable gardens, lantern-weed (Lavauxia), wild poinsettia, and mealy-weed invade the lawns, and dandelions and pigweeds flourish amazingly, but only depauperate specimens of dog-fennel occur so far west. Hollyhock, ox-eye daisy, double sneezewort, and cosmos occur, apparently growing wild, the last especially in such increasing numbers and frequency that it seems in a fair way to become naturalized in the vicinity of Colorado Springs. The first specimens of Jim Hill mustard appeared in 1913, coming in from the West where it was already a pest.

The dominating feature of a Utah landscape is its Lombardy poplars. Great close lines of them, veterans all, file along the roads and the boundary lines, closing in to double ranks along the sidewalks in the towns. Two other features of plant distribution are worthy of note. One is the wealth of the flora along the irrigating ditches, the other is the great number of adventive plants and weeds that are more common in the parts of the world that were earlier settled. Monkey-flower, water cress, epilobium, water cactus (*Senecio*), water parsnip, and the mints occur in and along the ditches quite into the towns. Blue vervain, sneezeweed, catnip, horse-mint, nettle, asters, and the various mustards lend an Eastern air that is sometimes most bizarre when contrasted with such characteristically western plants as sage brush, torchweed, gum-plant, and lupine: There are even weeds from the Old World,—*Lepidium perfoliatum*, *Sisymbrium irio*, *Malcolina*, and hare's ear, introduced presumably with sugar beet seed.

In the Snake river valley the ditches are almost destitute of wild plants. The banks are covered with grass, alfalfa, and salt-brush. There are occasional bunches of sneezeweed, and poison hemlock occurs, but the native desert plants seem quite content not to dispute this territory with the invaders. Of the fifty "worst weeds" listed by the Department of Agriculture, only fifteen occur in this locality and only six of them in sufficient numbers to constitute a pest, while only two, the Russian thistle and prickly lettuce, could properly be called "worst weeds."

While these observations are disconnected and perhaps of little value alone, they are typical of similar facts that can be gleamed from every locality and which are seldom found in books. Until we cease waiting for scientists to write books to reveal nature to us, and get busy ourselves all over the land observing and recording just such apparently little things, botanical literature will of necessity be only of very general application.



AN UNKNOWN HONEYSUCKLE

By Willard N. Clute

IN the spring of 1917, the Foreign Seed and Plant Introduction Division of the United States Bureau of Plant Industry forwarded to me among other new plants for trial, a species of *Lonicera* (No. 39697) from Nanking, China, collected by Joseph Baillie of the University of Nanking. This plant, which is an erect shrub, has made a remarkably luxuriant growth in our grounds, new shoots reaching a length of six feet or more in a single season. During the spring of 1919, the plant flowered for the first time, being well covered with rather small pink-white flowers which were succeeded by pale red berries that remained on the plant all summer.

Although the blosoms are of no especial beauty, yet their abundance gives the plant an attractive appearance in spring.

The luxuriant growth of which the plant is capable should make it desirable for border planting. Judging from appearances, the mature plant is of moderate size. A flowering twig is illustrated.

Inquiry at the Bureau of Plant Industry elicits the information that the species has not yet been identified. The only description which accompanied the original material to this country was "Red berried shrub; flowers like woodbine."

RARE PLANTS OF OREGON

By R. V. Bradshaw

THE white-stemmed filaree (*Erodium moschatum*), a recently introduced plant from California, seems to adapt itself very readily to our Oregon climate. Although far from being as common as its close relative, *Erodium cicutarium*, I have observed it growing abundantly in rich waste ground about Eugene during the past summer. Whether it will survive the cold weather of the past winter yet remains to be seen.

Linaria Elatine, a procumbent toadflax, which Gray's Manual gives as rather rare "Mass. to N. C. and Mo.," I had the pleasure of finding as a solitary plant in bloom among some of my English daisies a couple of years ago. Since then I have seen more specimens of it. I have no knowledge that it has ever been found in Oregon before.

In the summer of 1917, I came upon a group of interesting plants growing on a parking in Eugene. The owner of the land assured me that he had been trying to get rid of them for ten years. He wanted to learn something about them, but I was unable to give him anything more definite than that they were rare and belonged to the genus *Centaurea* in which was included the common bachelor's button. This year the Gray Herbarium identified them as *Centaurea nigra,* or the black knapweed, a plant which has advanced from Europe to the Eastern States where it had become a rather bad weed.

Cynosurus echinatus, commonly called the dog's tail grass, I considered a lucky find. It is also a recent arrival from Europe. In the Mediterranean region, I am told, it is a troublesome weed. I do not think that it has been found in Oregon before. However, I believe it has been collected in British Columbia, by Prof. Henry. Here it is somewhat abundant on a slope on skinner's Butte, which overlooks the railroad. Some six miles away on Spencer's Butte, I have also observed it in an open place surrounded by dense woods. The city of Eugene is situated between these two buttes. It would be interesting to know how the grass got to the two places mentioned.

SOME TEXAS WILDFLOWERS

By Mrs. D. C. Hackney

MY home is on a prairie that extends to the Gulf of Mexico, fifty miles away. The region was once the bottom of the ocean. The soil is cold and heavily sodded, but it is productive when well cultivated and is glorified the major part of the year by many different kinds of wildflowers.

The latter part of February or earlier if the winter has been mild, the fragile prairie violets are in bloom, being the immediate successors of blue and yellow crocuses. If, when gathering violets, a lambent, vivid flame is seen in the new short grass, one's allegiance is immediately transferred. The brittle stalk of the "flame" is broken close to the ground and soon one has a handful of the beautiful wild Indian pinks (*Castillejia.*)

I have seen Indian pinks bloom as early as January along the side of bridges and in thick clumps of grass. If the soil is fertile, there is a great bunch of vivid dark red stalks; if the soil is poor, there are one or two spikes of a yellowish scarlet; but all are beautiful. The plant has a sour clean odor like that of a geranium. The tinted leaves are the bracts surrounding the inconspicuous flowers and in good soil will show faintly red half way down the spike. The plants resent transplanting more than any other wild flower that I have tried.

A cheerful and versatile bloomer of April is the wild coreopsis. There are several kinds; one a compact bushy variety with small intensely yellow flowers, another a tall variety with larger, handsomer blossoms that have a cultivated look, and still another kind with maroon colored flowers. Their stay is fleeting but their beauty is prodigal. They appear as sheets of gold on uncultivated acres of prairie and when they ripple into waves it is an unresponsive and thankless human being who fails to be edified and uplifted.

THE TRUE NATURE OF PLANT DISEASES

By A. A. Erz, San Francisco, Cal.

IN spite of increased protective measures against diseases, insects, and other pests menacing our plants, the number continues to multiply. In many cases it seems impossible to find a permanently successful remedy, and in most cases the remedial measures must be periodically repeated. The general belief is that the solution of the whole serious problem must be left to technical science and chemico-mechanical means. Without attempting to belittle, the good work done by our Horticultural Department, how would it be if, instead of relying on the chemico-mechanical measures of protection, an attempt was made in an entirely new direction for the solution of the problem? There are some indications that our current ideas about combating the diseases and parasitic pests are misleading, and that we must look for new conceptions of the true nature and cause of these troubles. Some progressive people are striving to obtain plants immune to disease and parasites. Agents of the U. S. Agricultural Department, are ransacking foreign countries in search of immune plants and such native stock as could be utilized in regenerative and crossing experiments with our more or less non-resistant plants, the latter perhaps the outcome of our somewhat irrational and too hasty commercialized horticulture. In what does immunity of plants really consist? How does this natural protective principle manifest itself in plant life? Under what particular visible or tangible conditions does this innate protection against disease show itself? There seems to be only one reasonable explanation, namely, that we assume the plant, under certain favorable conditions to be capable of producing its own protective elements; and that these are evidently of a highly subtle nature, for we have not been able to detect them with our most powerful instruments, and are not able to analyse them. The process of producing these protective elements can only be explained by presupposing the production of a specific principle, upon which the assimilation of the plant food depends and which is responsible for the condition known as immunity. Should this be the case, then the solution of the whole problem of immunity would be at hand, and the fruit growers would have to look upon our progressive investigators in this direction as the saviors of horticulture.

I have been fortunate enough to come in contact with one of these independent investigators, who for the past ten years has given his spare time to the study of this question. He is in a position to prove that nature does provide plants with protective elements, the production of which depends on certain natural conditions to be furnished. The natural, innate protective elements can only be produced by the plant itself, and cannot be manufactured. A fruit tree provided with these elements becomes so completely immune that you may carry large quantities of parasites to it without one of them harming it. No rabbit will eat off the bark, no gopher or mouse will attack a root, wounds will heal quickly. To quote my friend, Mr. H. F. Schmid, of Canyonville, Ore:

"The development of the protective elements can be greatly helped by the aid of our method of modified culture, including the providing of the essential soil material. The presence of the protective elements has so far not been discovered by analysis or the microscope. Plants apparently immune to the one or another disease can be found everywhere, while trees entirely immune are today very rare. The cause of this immunity has remained a riddle to science. It has been proved that the animals are immune to certain bacilli, the most insidious enemies of life, as long as they are healthy and able to produce their protective elements. Analogous to this fact, I have found that plants, and especially fruit trees, under normal conditions, will act the same way, provided they obtain a sufficient degree of wholesomeness, under proper culture. A fruit tree gets diseased and loses its resistant power because under wrong culture it becomes unfit to produce its own protective elements against its enemies, and finally becomes unfit for the reproduction of its own kind. If the development of protective elements is made possible, the symptoms of disease and the parasites will disappear as quickly as they came, since their presence is the result of a lack of the necessary vital conditions and the nutritives in the soil It is not difficult to make a contrary test of this discovery on any relatively healthy tree, by producing certain diseases or dispositions favorable to parasites."

Thus we see, that we must look for a different conception of the true nature, cause, and cure of disease one more in harmony with the laws of nature. Otherwise, the ever increasing number of diseases and pests, which have already reached menacing dimensions and are causing enormous loses, will end in disaster to our whole horticulture. Who can claim that he knows all about these matters? We are only beginning to understand something about fruit culture. We certainly should encourage investigation of this kind. Conviction, in matters like this, does not come through arguments, but by *experiment.* My friend is willing to submit his discoveries to proper experimenting.

COLOR VARIATIONS OF FLOWERS

By R. V. Bradshaw

IN the *American Botanist* for August 1919, Prof. J. C. Nelson gave a list of Oregon flowers which vary in color. I should like to add the following to the list:

Flowers of Different Colors

Alisma Plantago-aquatica, white or pink.

Iris tenax, from the usual purple shades to white.

Calypso bulbosa, pink to white.

Eschscholzia californica, yellow with orange center to white.

Vicia gigantea, ochroleucous to pink.

Lomatium macrocarpum, white to nearly yellow.

Prunella vulgaris, besides the colors mentioned I have seen a common pink form.

Synthyris rotundifolia, blue, pink, or white.

Erigeron salsuginosus, pink to blue.

Erigeron decumbens, white to pink or blue.

Achillea Millefolium, white to pink.

Parti-Colored Flowers

Fritillaria pudica, yellow and orange.

Eriogonum umbellatum, yellow or yellow tinged with red.

Ranunculus orthorhynchus, yellow on the inside of the petal and brown on the outside.

Viola Sheltonii, yellow on the inside of the flower and brown on the outside; sometimes the brown is lacking.

Linaria vulgaris, yellow and orange.

Downingia elegans, besides the usual blue, white and yellow there is a pink form wherein the blue is replaced by pink.

Madia elegans, strap-shaped corollas yellow with brown or red spot at base.

Gaillardia aristata, same as above.

Flowers Changing Color

Lilium washingtonianum, white becoming pink.

Cynoglossum grande, pink fading to blue.

Mertensia paniculata, blue fading to pink.

PERPETUATING OUR NATIVE FLORA

By F. W. VonOven

IN the past the perpetuation of our native flora has been largely in the direction of stimulating an interest in the plants themselves. Many landscape architects and gardeners in working out their designs for planting have adhered strictly to the use of American species and varieties, but this is not sufficient. We need a more intelligent interest in plants of superior qualities such as may be found in various parts of our country. Plant lovers often have such superior plants in their gardens, but the valuable points of such specimens will never become known unless the owners co-operate with the nursery men in multiplying and perpetuating them.

The United States has for years been largely dependent upon foreign countries for its supply of young plants. We are still budding most of our apples on French crab and only in recent years has the American apple seedling come into use. We are budding our cherries on Mahaleb, mazard and morella stock of European origin and most of our pears on Keiffer and Japan pear seedlings, a large proportion of which have been grown by Europeans for the American trade. Foreign horticulturists and nurserymen with the aid of cheap labor and years of experience in selecting the best locations for their stock have been able to propagate many varieties in a way to successfully compete with American grown plants.

One of the first great victories of American over European growers was when one of a firm of Illinois nurserymen took samples of Illinois grown evergreens to eastern nurserymen and received an order on condition that if not satisfactory the stock could be returned. The evergreens were shipped and a check subsequently received for the goods.

Since the plant quarrantine went into effect, largely eliminating imported stock, the movement toward the production of American fruit stocks has become very necessary. We have a very excellent Bureau at Washington called the Bureau of Plant Industry which is making valuable tests of plants, both foreign and native for all sorts of soils and climates. It is very desirable that we have such an active and efficient Bureau as this which is of course primarily interested in securing plants for commercial purposes. But we need also, to search out and develop the better forms of our native plants both for commercial and decorative purposes. In this it is very desirable that botanists and nurserymen co-operate.

The United States contains a broad and diversified region in which there are a great number of herbaceous perennials, shrubs and trees that are desirable. While botanists plant lovers and protectors of our native flora are probably best informed as to the locations in which desirable specimens grow, the nurserymen afford the best means for multiplying and distributing such plants. Botanists, landscape architects, gardeners and the like, should make note of the location of specimen trees or other desirable plants especially those that are characterized by special hardiness, vigor, fine foliage, larger and better flowers and fruits etc., and should provide when possible for the collection of seeds or young plants. It is not always possible for the nurseryman to be on hand when seeds mature. The nurserymen, however, are in a position to plant such seeds or plants and to multiply them by cuttings, divisions, etc.

It is not likely that the nurseryman will fill their grounds with hundreds of varieties of miscellaneous plants which have no real value in landscape or garden work and for which there is little call. But if these more desirable plants become established and their value known, their multiplication will do much to perpetuate the forms. It is suggested, also, that the good points of every species should be compiled and preserved for reference in the further development of American Horticulture.

Some of the forms worth hunting for are hawthorn trees without thorns, hawthorn trees with especially bright colored bark in winter—light bronze, copper or silver, a very dark pink or red wild crab or hawthorn, a dwarf form of wild crab with horizontal branches close to the ground, red cedars with single stem, upright growth and dark green foliage, hardy natives roses of dwarf yet vigorous type that do not produce suckers and therefore suitable to bud perpetual and hybrid tea roses on, hawthorn stock for budding pear and quince, native plants that will be suitable for dwarf or medium sized hedge plants, dwarf native shrubs of good foliage and extra floriferous, and herbaceous perennials that are desirable for our perennial borders especially those that bloom in midsummer when flowers are scarce.

The writer as a nurseryman has had some difficulty in finding reliable sources of seed supply, not to speak of getting seed from vigorous types. It seems quite impossible to get seeds of Dutchman's pipe vine, moon vine, *Magnolia acuminata*, northern climbing honeysuckle to say nothing of the seeds of valuable herbaceous perennials. I would like to get seeds from specimen trees of *Acer rubrum* from Wisconsin, Massachusetts, New York, Minnesota, and the same is true of American beech, water beech, Kentucky coffee-tree and others. In this work, botanists could be of great assistance in locating desirable specimens and providing for a supply of seeds from year to year. If we all co-operate in this matter, and endeavor to secure such information regarding specimens as may be obtained, the perpetuation of our desirable plants will be more secure.

BOTANY IN THE SCHOOLS.—There is no reason for surprise in the patent fact that few of the myriads of students of botany during the last half century have become professional botanists: investigators are born not manufactured. there may be just ground even for a growing feeling that in its application to education botany should appear in a different guise and with different accents from the same science as the investigator knows it. If we are wise and alert who wish to see botany or even biology at large continue—as we all must believe that it should—an element of popular instruction, we must see that in the school it regains that simple, understandable, everyday relation with everyday life that its vastly simpler precurser possessed; that in the college its more complex present day relations with life are made part of the equipment of all those who are to teach it in the schools and to follow it into the university; and that in the university its study is characterized by that breadth of understanding and a scope of vision commensurate with that refined specialization which marks the successful delver after facts.—*Prof. Wm. Trelease in Science.*

NOTE *and* COMMENT

More About Loureiro.—I notice an interesting article in *The American Botanist*, Vol. XXV, No. 4, for November, 1919, page 129, entitled "A Little-Known Botanist," by J. C. Nelson. It may interest your readers to know that the well-known American botanist, Prof. E. D. Merrill, now acting Chief of the Bureau of Science, Manila, P. I., has been giving very close attention to that monumental work, Loureiro's "Flora Cochinchinensis," and has gone over the whole work in an attempt to identify the species named by Loureiro. Loureiro's work is of fundamental importance for the flora of Indo-China and Southern China. Unfortunately, Loureiro's herbarium is apparently lost. Only a small number of specimens were sent to the herbarium in Paris and to the British Museum in London. One other point perhaps deserves mention—that Loureiro, as he himself states in the preface to his "Flora Cochinchinensis," when he first began collecting had no modern botanical books, but later on, through the generosity of Dr. Thomas Riddell, an English ship-doctor, was presented with copies of *Genera Plantarum*, *Systema Naturae*, and *Philosophia Botanica* of Linnaeus. Loureiro's shorter and popular works were published in Portuguese and not in Spanish, as would appear from the title quoted on page 132, from Colmeiro's work. The correct title of this work is: "Loureiro, Joao de, Da trasplantacio das arvores mais uteis de paizes remotos, in Memorias economicas da Academia real das sciencies de Lisboa, 1:152-163, Lisboa, 1789."—*Walter T. Swingle, Bureau of Plant Industry, Department of Agriculture, Washington, D. C.*

RARITY OF CONOPHOLIS.—I notice with interest your comment in *American Botanist* regarding the rarity of *Conopholis*. Although it is not one of our common plants in Western Pennsylvania yet I have seen many specimens. A few years ago I collected some fine specimens on the roots of the black oak on a thinly wooded hill in the outskirts of Pittsburgh. This particular specimen had probably eight or nine fine sturdy stems and had caused a woody gall about as large as one's fist on a root, perhaps, half an inch in diameter. Around this same tree there were several other smaller specimens, and I have collected the species in several parts of Western Pennsylvania, always in rather elevated, poor, and likely quite acid soils with black or red or chestnut-oak woods.—*O. E. Jennings, Carnagie Museum, Pittsburgh.*

FLOWER-BUDS TWO YEARS OLD.—According to a writer in *American Forestry,* the empress tree (*Pawlonia imperialis*) produces its flower-buds two years before they open. It is stated that "It requires two years for the blooming period; that is, the flower-buds require two years to make." Although we are too far away from specimens of *Pawlonia,* to investigate the matter, we feel sure that there must be some error in this statement. The tree may blossom only every other year, though the trees we once knew were annually covered with blossoms. Along the Atlantic coast the empress tree is hardy as far north as Massachusetts and nearly always blooms in the New York parks. Someone who is closer to the trees than we are might settle the question.

CASH FOR SEEDS.—It is not generally known that the nurserymen depend upon the seeds of wild plants for many of the specimens that they grow. They are too busy growing plants, however, to attend to the collection of seeds themselves and in consequence are nearly always in the market for various kinds. The seeds of even common species are in demand. For instance, we have recently had requests for somebody who could collect seeds of *Asclepias tuberosa* and prickly ash. The prices paid for seeds range from a few cents to a dollar a pound, or even more when the seeds are small or light. In general it is not desirable to spend time in collecting a miscellaneous lot of seeds, but if one happens to live where seeds of desirable kinds are plentiful, the collection may do a good turn for the nurseryman and result in increased income as well. Now that the famous plant embargo has excluded—temporarily, we hope—a number of the desirable things from Europe, attention is turned more than ever to the interesting things in our fields and woods. Those who are inclined to take up the collection of seeds would do well to communicate with Messrs. Bobbink & Atkins, Rutherford, N. J. or with Naperville Nurseries, Naperville, Ill.

DASHEENS.—Through the kindness of Prof. S. M. Tracy, of Biloxi, Miss., we have had the opportunity to try out that recently introduced tropical vegetable known as the dasheen (*Calocasia antiquorum esculentum.*) This plant is a near relative of the caladium, or elephant's ear, grown in northern regions as a lawn plant, and it has other relatives in every public conservatory, to say nothing of such humbler kin growing wild, as the Indian turnip, sweet flag, and skunk's cabbage. The edible portion is the short upright stem, technically a corm, which is a bulblike object often as big as one's two fists. When boiled or baked they have an attractive nutty flavor faintly suggestive of artichokes. Were the white or "Irish" potato less firmly entrenched in popular favor, the dasheen would likely be in greater demand than is now the case. In the South, however, where the white potato is not the staple article of food it is in the Northern States, it is likely that the dasheen will find a steadily growing market. In the cooler parts of our country it is also likely to find favor as an agreeable change from too much potato.

THE AMERICAN CODE—Occasionally the worm turns. A good deal of fun has been poked at the "American Code," but its supporters seem to find some things to say in its defense. N. L. Britton reviewing the "Flora of the District of Columbia" writes as follows: "It goes without saying that the nomenclature of the District Flora follows the American Code rather than the so-called International Code forced down the throats of the Vienna Congress by a German majority and further manipulated by the same majority at the Brussels Congress. We can well understand why the French have never recognized it as valid and why anybody but Germans and Austrians should so regard, it has always been a puzzle, especially as the American Code is much more logical and cuts out autocracy. The Washington Botanists have followed the American Code consistently in almost every item except the duplicate binomials; they do not say why these have not been used; zoologists have used them for many years without losing sleep and *Sassafras Sassafras* runs well with *Corvus Corvus*. * * *It may be they are influenced by the line of thought advanced by Engler at the Vienna Congress when we asked him why he objected and he told us principally that such names had made some of his students laugh! And so the risibility of juvenile Huns prevented their adoption at that highly amusing convocation."

EDITORIAL

We have discovered the name of the plant asked for in the November number of this magazine! As soon as the issue was in the mails we began to hear from it. Plant collectors, housewives, teachers, eminent botanists, and others not listed, informed us that the plant is *Aegopodium Padograria* var. *variegatum* until it seemed as if the only people who did not know the name of the plant were the editor and the subscriber who inquired about it. Anyway, this pretty effectually disposes of the delightful fiction that "the editor, he knows everything." It is reported that when Dr. Asa Gray was asked the reason for a botanical slip he had made he replied "Pure ignorance, gentlemen, pure ignorance." In this respect, as the young reporter would say, Dr. Gray hasn't anything on us! The present instance is of special interest in that it illustrates the care with which the statements in this magazine are scritinized by authorities and the kindly interest which prompts even eminent men to turn aside from weightier matters to answer requests for help. Botany still appears to be "The Amiable Science." We extend our sincere thanks to those who helped us in this matter and trust that we may continue to be set right when we slip. If we did not make a sufficient number of errors through sheer ignorance, we should be tempted to make a few by intention just to make sure our readers were still on the job.

* * *

After a highly varied career for nearly a quarter of a century, the *Plant World* of Binghamton, Washington, Denver, Auburn, and Tucson has ceased publication. It has been taken over by the Ecological Society of America and will be merged with a new publication called *Ecology* which will be the official organ of the society. The Plant World was founded in 1897 by the editor of the *American Botanist* in conjunction with two other scientists, but the publication long ago went west to seek its fortune and has thus come to an untimely end. When the first issue of the *American Botanist* appeared, the *Plant World* informed an expectant public that it was doubtful if the new publication would live. Subsequent events, however, have indicated that such apprehensions were quite unfounded. Like all other botanical publications, with one exception, the *Plant World* has been financed by clubs, societies, or wealthy individuals. The *American Botanist,* alone, jogs along on its individual income. It has never been subsidized by anybody and never expects to be. There are now but two botanical publications in America that are older.

* * * *

The demise of the *Plant World* once more emphasizes the straits in which the botanical publications find themselves. In order to keep in the race, the *Guide to Nature* has recently increased its price from $1.00 to $1.50, the *Gardener's Chroicle* has increased from $1.50 to $2.00, *Torreya* has become bi-monthly at its former price which is equivalent to an increase of 100%, *Science* has increased to $6.00, *Torrey Bulletin* has increased to $4.00 and the *Journal of Botany* has increased from $4.00 to $5.00. In recent years the *Botanical Gazette* has increased to $7.00 or more. These advances have been made necessary not only by the increased cost of materials and labor, but because students of botany are not supporting botanical publications as they should. The problem of continuing such magazines is not one in which the editors and publishers are alone interested. If the income of any publication is not sufficient to pay its bills, it is only a matter of time when it will cease to appear. Subscribers who do not wish to see the field of their chosen science left without publications should support them more heartily. If you have a favorite among the magazines, you should not only subscribe for it yourself, but you should get your friends to do likewise. A little hustle now is worth many regrets after a magazine has suspended.

* * *

When it is recalled that ordinary type-stickers are clamoring for more than a dollar an hour for a forty-hour week and that paper-makers are demanding from twelve to sixteen cents a pound for book paper worth about seven cents, it is easy to see what the publishers of magazines are up against. More than half of the strictly scientific magazines are now carried by publishers who have no hope of adequate return, but who continue to provide information in much the same spirit that the true scientist publishes his discoveries to the world. The editor of *The American Botanist* is no exception to the general run and has gradually found himself in the position of the diminutive newsboy who was found buying papers for two cents and selling them for the same price. When asked what he got out of such a transaction he replied "I git a chance to holler!" There may be some who think that as long as the editor gets a chance to "holler" he should be satisfied, but they fail to consider what might happen if he gets tired of hollering. The best way to keep this magazine on the job is to push it whenever you can. Urge your friends to subscribe and mollify your enemies by subscribing for them!

* * *

The effort to secure superior varieties of our native plants for cultivation discussed on another page of this issue is worthy of general encouragement. Superior forms are all about us and need only to be reported to become valuable. Among those that have come under our personal notice is a form of the smooth sumach (*Rhus glabra*) which produces a round-headed plant with a single stem quite like some of the dwarf trees seen in formal plantings. In 1919, the late L. H. Read of Deer Park, Alabama, sent us a form of the common obedient plant (*Physostegia Virginica*) with leaves and stems twice the size of the common form and correspondingly vigorous. We have, also, a form of the cone-flower (*Rudbeckia hirta*) with truly gigantic flower-heads. The plants are so distinct that they may be picked out of a bed of mixed seedlings. The red-flowered form of *Rudbeckia* was first brought to notice by us, having been grown from plants with only the faintest trace of red in the rays. Another remarkable specimen is a red-leaved peach much deeper in hue than any other red-leaved tree in cultivation. We have a form of locust (*Robinia*) with a single leaflet jointed to the peticle after the manner of the orange, a mandrake (*Podophyllums*) which bears several fruits on a single stem, various albinos of wild plants, and other forms as curious. Some of these are of value only for their oddity, but the fact that such forms exist warrants the belief that other variations from the normal may be found that will be of commercial importance. It is hoped that every botanist will be on the watch for such things during the approaching spring and summer. A large number of the desirable varieties in cultivation were not, as comonly supposed, bred up by the grower, but came directly from the wild. The double flowering crab, the golden-glow, the salmon-colored dogwood, and some of the hydrangeas are among this number, while several blackberries, grapes, and other fruits have had the same origin. If plants are found at a time when they cannot safely be moved, the spot should be marked and seeds or plants collected after.

* * *

This paragraph is for subscribers, only. To them we wish to say that the statement that our supply of back numbers is running low is no advertising bluff. We have less than thirty sets left at this writing. It is to our interests to have as many subscribers as possible own complete sets and to induce others to fill their sets while they can, we offer any volume in stock at 20% from list prices. As a further inducement, all who complete their sets secure the magazine at 75 cents a year. The saving in subscriptions would in a few years pay for the back numbers. The phase of botany to which this magazine is devoted, is sure to occupy a prominent position for generations to come and what is already printed must always be taken into consideration. The back numbers will always be worth the price paid for them; indeed they will grow in value with the years. The offer of back numbers, however, does not include the thirty full sets. Anybody who would like the first 25 volumes and does not wish to pay the full price of $15 now, may send us such sums as they wish and we will at once lay aside a set for them, and send them the value of their remittance in the most recent volumes. When $15 in all has been sent and the value of the money received in back volumes, we will send the remaining volumes absolutely free. By ordering now an additional saving will be made for prices will be advanced before July.

BOOKS AND WRITERS

There are some circumstances in which high wages are not advantageous. In the book world, for instance, the cost of production has greatly decreased the number of new books. This, of course, is not an unmixed blessing for many books appear annually that do not deserve to see the light of print. Among the number of books rejected, however, there are likely to be many that in less strenuous times would have made good with the public. They are now denied the chance. A few years ago, if a book gave any indications of being a possible success, the publisher took a chance on it, but the cost of issuing is now so great that a book must have very obvious merit to get printed at all. In effect, the decision as to what is, or is not, a desirable book has been largely shifted from the public to the publisher. Publishers as a rule are a pretty wise lot but they sometimes miss it, in which case the public is denied a book which otherwise it would receive with profit.

We have seldom found more interesting reading for the botanist than that which comes to us in a thin little book of only fifty-nine pages by Prof. F. O. Bower of the University of Glasgow. It is one of the "Pioneers of Science" series and recounts briefly the life of Joseph Dalton Hooker, possible the foremost of British botanists and the one above all others who made the great Kew Gardens famous. The name of the author is a guarantee that the book is both intelligible and interesting to the layman. An excellent portrait of Hooker forms the frontispiece of the volume. Other names in this same series are Galileo, Faraday, Herschel, and Wallace. A number of others would be welcome. The book is published in London at 2 shillings but is for sale on this side by the Macmillan Company of New York.

Although botany has for some time past evinced a trend toward the economic, practical, books dealing with this phase of the subject are still somewhat rare. Sargent's "Plants and Their Uses and Rodgers' "Useful Plants Every Child Should Know" are about the only books on the list. Next spring Robert H. McBride & Company will bring out a book by C. F. Saunders on "Useful Wild Plants" and there are various indications that other books of this nature are in the making. In addition to these, there is available a very excellent book which approaches the subject from the chemical side. This is E. H. S. Bailey's "Source, Chemistry, and Use of Food Products." That the book is appreciated is shown by the fact that it has been reprinted four times since its appearance in 1914. The book is especially full as regards the composition of the various foods, and the processes they go through in being fitted for the market. The history of each food plant is given with notes on cultivation, harvesting, storing, etc. In addition to the plant foods, there are chapters on meats, fish, milk, eggs, and animal fats as well as on condiments and beverages. We notice a number of errors in the names of plants, but otherwise the book is above criticism. It contains 540 pages and 75 illustrations and is published by P. Blakiston's Son & Co., Philadelphia, at $1.60 net.

There are fads in education as well as elsewhere. For a long time, Nature Study was the center of attraction and when interest in this waned, general science oozed in. Out of this latter has sprung a new fad—the "project" or "problem" method of teaching a science. No longer are such courses supposed to begin at a definite point and end at another equally definite, but the student is now expected to take little samples, here and there, in the hope that if one does not suit, he may perhaps fancy another. To meet the demand for nibbling courses, books are beginning to appear. The majority are written by experts and if, in time, this phase of education goes the way of so many others, it will not be the fault of the book-makers. Of a slightly different character from the type of book indicated, though still capable of being used in "project" coures, is W. L. Eikenberry's "Problems in Botany," a small volume containing 118 exercises dealing with various phases of plant life. The exercises are well selected and cover the usual range of botanical experimentation, but in the opinion of the reviewer, a considerable number might have been omitted as of no especial significance while for some others shorter and clearer methods could have been substituted with advantage. On the whole the book is a decided addition to botanical literature and good teachers will find many features in it to commend. Used with a good text it should produce results. In the directions for work, we feel that too much emphasis is placed in the notebook. The fact that the student can set up and carry out an experiment to its proper conclusion ought to be sufficient indication that he understands the work. No single thing so disgusts children with courses in science as the everlasting marking time with pen and ink. The book is published by Ginn & Co. at 75 cents.

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Vol. 26. No. 2 Whole Number 125

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MAY, 1920

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WILLARD N. CLUTE, EDITOR

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PHOTO BY F. D. WALKER

Nonnezoshe Arch—*Southern Utah*

THE AMERICAN BOTANIST

VOL. XXVI. MAY, 1920 No. 2.

The robin sings as old from the limb
The cat-bird croons in the lilac bush
Through the dim forest, himself more dim
Silently flits the hermit thrush.
—Lowell.

NOTES ON THE NAVAGO REGION

By WILLARD N. CLUTE.

The two months which I spent in and about the Painted Desert in Arizona in the summer of 1919, were not primarily for the purpose of collecting plants, though some sort of a specimen was made from all the species in bloom that could be conveniently reached. A study of the material, however, has brought to light a gratifying number of novelties and leads to the conclusion that if such superficial collecting yields new species, a careful exploration would yield many more. President Aven Nelson of the University of Wyoming, whose work on the botany of the Rocky Mountain region is so well known, has kindly supplied the names for the plants collected and these as far as identified are listed on another page of this number. In a later number, he will report on some twenty species that appear to be new. A more general account of our itinerary appeared in this magazine for August, 1919, but since the region in which I collected is so little known, botanically or otherwise, it seems desirable that a somewhat

JUN 14 1920

more extended description of the stations visited be given for the benefit of others who may chance to pass that way.

Nonnezoshe Arch

One of the principal objectives of our expedition was a visit to the great natural bridge, known as Nonnezoshe Arch or Rainbow Bridge, just over the line in Southern Utah. This was discovered by the leader of our party, Prof. Byron Cummings, in 1909, and has since been visited by a limited number of explorers, ranchmen, globe-trotters, and naturalists. The bridge is a vast arch of stone, the largest in the world, spanning Bridge Creek Canyon not far from its junction with the Grand Canyon of the Colorado. It is 274 feet wide and more than twice as high as Niagara Falls. As may be seen from our illustration, the bridge and the walls of the canyon in which it is located are practically bare of vegetation and offer poor collecting ground for the botanist. The only plants collected here were *Petrophyton caespitosum*, which formed mat-like growths depending from the rock shelves, and *Adiantum Capillus-Veneris* which was common on dripping ledges in the shadow of the bridge. The canyon, which heads toward Navajo mountain, contains considerable water and in its upper reaches supports a growth of cottonwoods, willows, and the like, none of which were collected. By means of a sixty-foot rope our party descended from an adjacent cliff to the top of the bridge, the women being second of their sex to accomplish this feat.

Navajo Mountain

Barring the only direct route to the bridge, Navajo mountain rises to a height of 10,416 feet. Its slopes afford almost the only source of water in an extensive region, and it is naturally the stopping place for all sorts of caravans. There are few spots in the United States more inaccessible. On the south and east it is separated from civilization by the Painted Desert, a region of bare rocks and burning sands more than a hundred miles in width, while on the north and west a vast and intricate network of cliffs and canyons make approach from that side next to impossible. There are, however, few inducements for civilized man to visit the region. Mining prospects are not promising, timber is absent or inaccessible, game is scarce, vegetation too scanty for profitable grazing, and springs occur at such infrequent intervals that the danger of running short of water is ever present. There are, of course, no roads and one must follow the indistinct rails, often over bare rocks, which serve the purposes of the wayfaring Navajo. The only real inducement for white men to visit the region is to see for themselves that most astonishing monument, the great bridge.

THE SUMMIT

The country adjacent to Navajo mountain is more than a mile above the level of the sea, but the summit is so far above this elevation that it pushes up into climatic conditions quite unlike those existing elsewhere in the region. Rains appear to be frequent though possibly of short duration, and the deformed aspens indicate that the snow in winter lies many feet deep. The mountain itself is a laccolith, but the lava of which the interior is undoubtedly composed nowhere comes to the surface. The summit and the approaches to it are strewn with immense rock fragments over which one must frequently crawl or jump. A forest of Douglas fir, Engelmann's spruce, and yellow pine covers the summit and the flora has some of the aspects of a mesophytic region, though the porous sandstones absorb the moisture too rapidly to permit of luxuriant plant growth. Here grow *Antennarias, Sedums,* painted cups, pentstemons, the willow herb, and similar plants. In a moist shade a new species of phlox with large bright pink flowers was found.

Endische Springs

On the southwestern flank of the mountain, at a spot known as Endische, a number of springs burst from a talus slope and supply an abundance of pure cold water—just how cold and pure can be appreaciated only by those who have previously been obliged to depend upon alkali water or the tepid fluid dipped up from hollows in the rocks, the common drinking place of sheep, cattle, horses and Navajos. With the exception of certain "tanks" or pools located at "Yellow House" about two miles south of Endische and apparently constructed by people antedating the Navajos, there is no other water on the south side of the mountain, though numerous deep ravines and canyons into which the immediate region is dissected delude the tenderfoot into thinking that there must be water just around the next turn. The transition from the desert to mesophytic and hydrophytic vegetation at Endische is so sudden as to be startling. One may sit here in the shade of cottonwoods, willows, amelanchiers, and aspens and see close at hand the junipers, ephedras, yuccas, and cacti of the desert crowding in. Over perhaps an acre, roses, violets, columbines, epilobiums, evening primroses, and geraniums make a friendly oasis beyond which the desert stretches away to the mesas on the horizon. We collected an unknown columbine at this place.

Red Rock Spring

The customary route from Endische to the summit of Navajo is over a trail leading around to the east and ending at War God Spring on the shoulder of the mountain at an elevation of about 8,000 feet. Good walkers and climbers, however, will find the route up the southern side of the mountain past Red Rock Spring much shorter and less tiring. The time needed for this trip is less than two hours. It is possible to take pack animals over this route, but there is only an indistinct trail. The spring is near the top of the slope, at about the right place to be most appreciated. At the spring I picked up a snail new to science—but new snails are an everyday occurrence in these parts.

VALLEY SPRING

The shortest of all routes to Lookout Ridge, whence the best view of the canyon country is to be obtained, goes west from Endische and, after negotiating several small and deep, but not difficult canyons, strikes a deep and narrow valley at the head of a still deeper canyon that heads directly against the ridge. Half way up this valley there appears to be permanent water, if one may judge from the roses, raspberries, and similar plants that occur. This spring is not marked on the maps of the region, nor, for that matter, is Red Rock Spring. The walk up the valley is delightful, though the climb up the talus slope to the ridge offers some difficulties.

WAR GOD SPRING

War God Spring is off the main route of travel to the bridge, but as it affords excellent water, cool and invigorating air, fine camping facilities, and an easy ascent to the summit, it is a favorite resting place. The longer one camps at this spring, the longer he desires to stay. The tall and far-spaced yellow pines, and the lack of underbrush give a park-like aspect to the place, and the ground is carpeted with flowers among which lupines, evening primroses, painted cups, Mariposa lilies, eriogonuims, penstemons, golden asters and the goldenrod-like *Petradoria pumila* take a leading part. Here and there low thickets of manzanita, Mahonia, and *Ceanothus Fendleri* add variety to the scene, and the latter affords ideal nesting sites for the pink-sided snowbird which is abundant. The crystal-clear waters of the spring have a temperature of about 15° above the freezing point. Near the spring were found a new gigantic evening primrose, an *Eriogonum*, and perhaps others new to science.

Aspen Springs.

One never gets entirely used to the sharp transitions from moist land to desert that occurs in this region. A few paces from the rill that runs down from War God Spring, the mountain sides are almost deserts. To find any spot moist enough to support mesophytic plants is an event. Passing around the mountain side to the north, however, at or above the 8,000 level, one arrives, in the course of a mile or two, at two tiny swamps not far separated and surrounded by dense aspen thickets. Here is a section apparently from a New England thicket. The plant population consists of dog-bane, meadow rue, geraniums, *Anaphalis*, and similar plants, and in drier spots, the bracken.

Hidden Spring.

Passing over the summit from War God Spring, one comes to a great ridge of rock fragments sloping down on the north to cliffs so high that though one is safely seated on some great rock, he instinctively grasps surrounding objects to avoid falling into the tremendous gulf. This is Lookout Ridge. One may here look straight down for nearly two miles. To the northwest, but apparently not far away, is the great bridge, now dwarfed by the cliffs that rise about it. On foot, it is not more than half a day's journey away, but on horseback the trip requires two days. From the ridge one may walk back to Endische in five or six hours. On our way back from the bridge on foot, our water supply gave out when we were on the north side of the mountain and a long way from anything to eat. After an extended search I found, late in the evening, a narrow ledge where a layer of harder rock forces an underground streamlet to come to the surface for a few feet. It is so well concealed in a small and almost perpendicular cleft in the mountain that we have since referred to it as Hidden Spring. Climbing up through this cleft the next day we found ourselves at the western end of Lookout Ridge and not far from the summit. There are, of course, no springs on the summit and the discovery of this spring will make it possible to camp there in future without carrying water for a long distance. To reach the spring from the forest area at the western end of the ridge, one descends nearly to the base of the talus slope and takes the first sharp ravine on the left. The water is almost at the head of this ravine. We later visited the spring from Lookout Ridge when I found, growing on the rock above the spring, a *Heuchera* new to science.

RED LAKE.

A long run from Kaibato or Tuba over bare rocks and traveling sand dunes brings one to Red Lake. There is a single house at Red Lake, perched on the top of a sandy hill and overlooking much dune country. The lake is a "playa lake" and visible during the wetter part of the year only. At the time of our second visit, the water was several feet deep in the lake and alive with water birds whose indifference to human kind was doubtless due to their unfamiliarity with them. On the sand dunes grew gilias, pentstemons, abronias and the like, and near the lake was a species of buttercup! An apparently new species of *Astragalus* wes secured here. A striking feature of the Red Lake landscape was the hemispherical clumps of *Chrysothamnus* which catch and hold the sand in tiny hillocks.

Marsh Pass.

Sixty-five miles east of Red Lake is Marsh Pass, a rock-bound waste in which there is often no soil whatever for considerable stretches. On the one hand are the cliffs of the great Black Mesa and on the other an immense rounded ridge of bare red sandstone with stunted pines and junipers here and there in the crevices. In places where soil has accumulated, we found sedums, flaxes, gilias, and, of course, cacti.

Laguna Canyon.

The most attractive feature of Marsh Pass is the fact that it is the entrance to Laguna Canyon. The canyon is so called, it is said, because it was once, and in historic times, a region of lakes and swamps. It is nearly desert now, though Laguna Creek winds through it entrenched in a canyon of its own cut many feet deep in the valley debris. At one point I noted a layer of peat nearly two feet thick which bears out the contention of its once watery character. Shells picked up in the peat show that it was inhabited by the same kind of snails that now creep over the water plants two thousand miles farther east. Laguna Canyon is a broad and attractive stretch with the ordinary desert plants in its drier parts but with room also for currants, roses, asters, evening primroses, yarrow, clematis, and other plants regarded as mesophytes. The most important features of the canyon, however, are the great caverns more than a city block long and correspondingly high and deep. In these caverns, some of the greatest cliff ruins yet discovered are located. At one of the largest, Betatakin, we spent some time, and I found high above the cliff dwellings a moist ledge on which grew a labiate that is either rare or new to science. From the point of view of the aborigines, the cliff community is advantageously situated. A spring of pure water issues from one side of the cavern, while the slopes below the entrance are covered with the edible yucca, oaks, willows, asters, and various bush fruits. There are innumerable canyons and ravines branching off from Laguna Canyon that have never been visited. The plants are, of course, unknown. When complete collections are made, we may expect many novlties in this region so long cut off from other areas of like character.

KAYENTA.

Kayenta, ten miles from Marsh Pass and the entrance to Laguna Canyon, always comes to mind when travel in this part of the world is mentioned. It is further away from a railroad than any other place in the desert, or elsewhere, for that matter, but it is nevertheless a real town with two stores, a post office, an Indian school, and several residences. It is the point of departure for the picturesque Monument Valley, the cliff ruins, Navajo Mountain, and the bridge. The presiding genius of the place is Mr. John Wetherell, under whose guidance the bridge was discovered and through whose family the cliff dwellings were discovered and made known to civilization. The region farther east and south of Kayenta through which we passed has been made familiar by the descriptions of the visitors to the Snake Dance of the Pueblo Indians, and needs no further comment here. Nor are the adventures with which the party met properly a part of this narrative. The last mentioned have been written up for the amusement of the writer's friends, but will not be published here.

FLORA OF THE NAVAJO RESERVATION

By Aven Nelson.

In the northeastern part of Arizona lies a vast area, perhaps well known as an Indian Reservation, but certainly inadequately known as to its natural history. This, however, is not so surprising when one recalls how new, after all, the great semi-arid mountain West really is. Many factors have contributed to this, among which may be named inaccessibility and the overshadowing lure of the economic possibilities. Strange and interesting as are the plants and animals of the ever-changing environment of these desert, canyon and mountain solitudes, yet their fascination pales in comparison with that of "the silver lode," "the copper mountain," or "the vein of gold" —possibilities that no one is ever allowed to forget. For many decades still, scores of localities will furnish collections of surpassing interest.

It has ever been a matter of incredulous comment on the part of those whose field experience has been confined to regions of comparatively constant ecological factors that every expedition in the interior West brings home its novelties. Those who question, simply do not realize how great are the extremes of the life factors:—heat and cold, moisture and drought, soil composition, light intensity, exposure to wind, seasonal variation—in this ancient world. Nor do they realize that unexplored areas larger than some of the New England states may be found hidden away in some of these western counties. This Desert (?) West is still a new world and happy is he who experiences the joy of trying to know and interpret the life and beauty of the primeval.

Among those who have recently felt the charm of the "Great Silences" is the Editor of the *American Botanist*. Called to Arizona on other business in 1919, the ruling passion,—his love for flowers and the vast blue-canopied out-of-doors,—drove him afield for some days in July and August. He chose as his field of exploration the Navajo Indian Reservation, particularly Navajo Mountain and its environs

Actuated merely by his love of the work and with no thought of exploration for novelties, he made his collections with thoroughness so far as the particular area covered is concerned. At the close of the season it was my good fortune to have the more than one hundred and fifty numbers submitted to me for examination, and it thus transpires that I have had the pleasure of studying these collections with Mr. Clute. This paper is in the nature of a report to him and carries the suggestion that the results of his work be made of permanent record in the *American Botanist.*

The comments following the list of species are from Mr. Clute's excellent notes.

LIST OF SPECIES.

1. *Petrophyton caespitosum* (Nutt.) Rydb. Forming mats swinging in the air from cliffs, dry or wet. Bridge Creek Canyon. July 13. The published range is Northern Wyoming to Montana and westward.

2. *Asclepiadora decumbens* (Nutt.) Gray. Flowers inconspicuous; common in the desert.

3. *Habenaria sparsiflora* Wats. Very abundant about War-God spring. Not seen elsewhere.

5. *Senecio Fendleri* Gray. A common weed in dryish ground.

6. *Oenothera Jamesii* T. & G. The common evening primrose, in moist spots. Plentiful at Endische and at Betatakin.

7. *Castillegia linariaefolia* Benth. So far as I could see, there was only one *Castillegia* in bloom, though there was a much redder one near Flagstaff.

8. *Eriogonum racemosum* Nutt. Plentiful in glades. Navajo Mountain.

8a. *Eriogonum microthecum Nutt.* With the preceding.

9. *Monardella parviflora* Greene. The most disagreeably scented mint in existence. Grows in rocky ground. Slopes of Navajo Mountain.

10. *Eriogonum cognatum* Greene. The handsomest and most floriferous *Eriognum* found. The buds are red and the flowers yellow.

11. *Oenothera.* Not in condition.

12. *Stellaria Jamesiana* Torr. Found in wet places in openings in the forest where shaded most of the time. Summit of Navajo.

13. *Epipactis gigantea* Dougl. Only specimen found.

14. *Polemonium pulcherrimum parviflorum* (Nutt.) A. Nels. Formed dense mats near the summit of Navajo.

15. *Sedum stenopetalum* Pursh. This *Sedum* common from War-god to the summit. Very attractive when in bloom.

15a. *Sedum integrifolium* (Raf.) A. Nels. A second species with violet colored flowers and a rather smaller plant was collected at Marsh Pass.

16. *Antennaria arida* E. Nels. This is the handsomest *Antennaria* that I know of. The flower heads are white flushed with pink. Forms extensive mats on the summit of Navajo.

17. *Symphoricarpos oreophilus* Gray.

19. *Trifolium andinum* Nutt. Var.? Summit of Navajo.

20. *Rubus strigosus* Michx. The only *Rubus* found. If this is *R. strigosus* it has sadly degenerated in the western part of its range. Berries insipid.

21. *Stellaria Jamesiana* Torr. Summit of Navajo.

23. *Eriogonum cognatum* Greene. Slopes of Navajo.

24. *Philadelphus occidentalis* A. Nels. This *Philadelphus* was so floriferous and so fragrant that it could be smelled for a considerable distance. Seldom found except on slides. Shrub has a grayish appearance. Slopes of Navajo.

25. *Pentstemon strictus* Benth. Abundant everywhere. Saw it at Grand Canyon, at Flagstaff, and all over Navajo.

26. *Lychnis Drummondii* Wats. Near War God spring.

27. *Acer glabrum* Torr. var. *tripartitum.* Growing about the edges of cliffs and rock slides. Hidden Spring.

28. *Purshia tridentata* DC. Plentiful among the cedars and pines at Endische Spring and found nearly to the summit. Easily confused with *Cowania* which is abundant at Grand Canyon.

29. *Geranium caespitosum gracile* (Eng.) A. Nels. A fine little geranium with pinkish flowers. Aspen Springs.

30. *Holodiscus dumosus* (Nutt.) Heller. This shrub is worth cultivating. Its very abundant panicles of light buff flowers made it quite conspicuous.

31. *Fritillaria atropurpurea* Nutt. Very common half way up the mountain in park-like spaces and fond of growing in mats of *Ceanothus.*

32. *Ceanothus Fendleri* Gray. Thorny, forming dense mats. Difficult to walk through but providing a springy bed, if covered sufficiently.

33. *Eriogonum racemosum* Nutt. Slopes of Navajo.

34. *Eriogonum alatum* Torr. The tallest *Eriogonum* we encountered. Leaves forming a rosette.

35. *Helianthella Parryi* H. & A. Just coming into bloom, but promised to be very plentiful in open places. Has the aspect of a *Rudbeckia*.

36. *Phacedia leucophylla* Torr. Near War God Spring.

37. *Petradoria pumila* Nutt. The most abundant "goldenrod" on the mountain. A very clean and thrifty looking plant.

38. *Chrysopsis arida* A. Nels. Golden aster, one of the commonest of plants but of no particular beauty. From Endische to War God.

39. *Actinella leptoclada* Gray. With the preceding.

40. *Artemisia tridentata* Nutt. Sage Brush. In one or two places it climbed the sides of the mountain up to 8,000 feet.

41. *Arenaria Fendleri* Gray. In tufts, in open places.

42. *Gayophytum ramosissimum* T. & G. In dry shades. Navajo.

43. *Monardella parviflora* Greene. Same as No. 9. Found at a lower elevation, but fully as malodorus.

44. *Solidago nemoralis* Ait. A slender goldenrod, not common, found along the stream from War God.

45. *Rosa neomexicana* Gray. Both fragrant and floriferous, as well as very thorny. In wet places. Endische, War God and elsewhere.

46. *Petradoria pumila* Nutt. Same as No. 37 but from a locality 2,000 feet lower. Endische.

47. *Gutierrezia microcephala* Gray. Very common in sandy places. Endische.

48. . .*Erodium cicutarium* L'Her. A tiny geranium from Endische stream. Flowers bluish.

49. *Aquilegia*. A bright red *Aquilegia* in wet places. Endische. Material a mere scrap not easily referable to any

known species. A full set of specimens may show that this also is new. Additional plants are being grown from seeds.

50. *Epilobium Drummondii* Hausskn. In wet grounds. Not conspicuous.

51. *Psilostrophe sparsiflora* (Gray) A. Nels. This bright yellow composite was so much like a Crucifer in appearance as to deceive everybody. Near Endische.

51a. *Pterispora andromeda* Nutt. We found this very abundant. One plant had twenty-one flower spikes. Thousands of plants wherever the yellow pine grew.

53. *Carduus bipinnatus* (Estw.) Heller. A very common thistle with pink heads and white-surfaced leaves; very attractive to humming birds. I do not recall a minute when I could not find humming birds by glancing at the nearest patch of thistles.

54. *Habenaria sparsiflora* Wats. War God.

55. *Pentstemon cyananthus Brandegei* Porter? In the absence of flowers, this is little more than a guess.

56. *Lupinus laxiflorus* Dougl. The abundant and only lupine in bloom.

58. *Oenothera coronopifolia* T. and G. An abundant and attractive *Oenothera* with cream colored flowers found in many dryish places but not often in sand. The banks of many dry washes were gay with these flowers.

59. *Oenothera pallida* (Lind.) Brit. In sand, not common.

60. *Frasera speciosa* Griseb. Columbo. Very Conspicuous. Flowers greenish and 4-parted the perianth fringed. Upper slopes and summit of Navajo.

61. *Pentstemon Bridgesii* Gray. Seen frequently.

62. *Cornus stolonifera* Michx. Betatakin Ruin and elsewhere.

63. *Coralorrhiza multiflora* Nutt. The only specimens of *Coralorrhiza* found. Summit of Navajo.

64. *Erigeron divergens arenarius* (Greene) A. Nels. Very Common.

65. *Eriogonum microthecum* Nutt. On the range near Endische. Very brittle and not abundant.

66. *Chrysothamnus* sp? The rabbit brush; widely distributed in the desert.

68. *Geranium caespitosum gracile* (Engl.) A. Nels. The same as No. 29. Aspen springs.

69. *Veronica Americana* Schwein. Filling the brook in spots at War-god.

70. *Chaenactis Douglassii* H. & A.

71. *Chamaenerion angustifolium* (L.) Scop. Summit of Navajo.

72. *Agoseris glaucum* (Nutt.) Greene. Plant like a diminutive vegetable oyster. Aspen Springs.

73. *Anaphalis subalpina* Gray. A handsome *Anaphalis* at Aspen Springs.

74. *Pyrola chlorantha* Sw. This *Pyrola* found in several places but not common. Summit of Navajo.

75. *Thalictrum Fendleri* Engelm. Aspen Springs.

76. *Apocynum androsaemifolium* L. Aspen Springs.

78. *Pachlophus macroglottis* Rydb. The largest *Pachylophus* I have seen. Flowers open white, but soon fade to deep pink. The flowers are 7 or 8 inches long and spring from a rosette of notched leaves.

79. *Chrysothamnus angustus* Greene. Possibly a *Chrysothamnus* but not the rabbit-brush as the settlers regard it. Forms hemispherical clumps.

81. *Grossularia leptanthum* Gray. The only gooseberry. In rock slides. Very sharp yellow-white thorns.

82. *Sporobolus pungens* Thurb. A grass with sharp tipped leaves; eaten by stock.

83. *Pentstemon ambiguus* Torr. Flowers pale bluish-white and produced so abundantly as to appear like small clouds on the desert sands. This is absolutely the finest flower on the desert.

84. *Sporobolus flexuosus* (Thurb.) Rydb. A tall grass on the range; with 82 and 85, about the only grasses.

85. *Bouteloua hirsuta* Lag. Black grama; the most important pasture grass.

86. *Oenothera Jamesii* T. and G. The great yellow evening primrose.

88. *Machaeranthera tanacetifolia* Nees. An aster with finely cut leaves from Laguna Canyon. Flowers deep violet, very attractive.

89. *Lepidium alyssoides* Gray. Laguna Canyon.

90. *Tradescantia scopulorum* Rose. Common on the range.

91. *Arctostaphylos manzanita* Parry. Quite common. Bark reddish, like mahogany.

92. *Juniperus communis siberica* (Burgsd.) Rydb. A juniper from the summit with low spreading branches.

93. *Coleogyne ramosissima* Torr. This is the stubbiest and most pestiferous plant to travel through that I have ever found. Even the mules turn out for it. In many places the desert is thickly set with it, making progress very tiresome.

96. *Sphaeralcea cuspidata* (Gray) Brit. Mallow. Abundant on the range with flowers combined of red orange and yellow.

97. *Ranunculus cymbalaria* Pursh. Red Lake, Marsh Pass, Laguna Canyon, and on the road to Farmington.

99. *Polypogon monspeliensis* (L.) Desf. In dry sand. A diminative grass like *setaria*.. Stockmen claim that this grass is pushing in from outside, which is likely the case.

100. *Verbena bracteosa* Michx. Sprawling over the ground. Monument Park.

101. *Actinella leptoclada* Gray. Same as No. 39.

102. *Dondia Moquini* (Torr.) A. Nels. Sometimes called white sage.

103. *Mentzelia multiflora* (Nutt.) Gray. Flowers like small, yellow chrysanthemums. Monument Park and elsewhere.

104. *Ximenesia encelioides* Cav. Sunflower-like composite near Red Lake.

105. *Abronia cycloptera* Gray. Seeds with wide and ample wings which make the seed head very conspicuous. Frequent near Antelope Springs. Not previously reported from Arizona.

106. *Thelypodium Wrightii* Gray. Laguna Canyon, Rare.

107. *Clematis ligusticifolia* Nutt. A fine clematis clambering over the bushes in Laguna Canyon. Abundant at Betatakin Ruin.

108. *Ribes cereum* Dougl. Currant with orange colored fruits strewn with yellow resin grains. There is great variation in the fruits but all are palatable in the desert!

109. *Ephedra antisyphilitica* Mey. Mormon Tea. Common in the desert. Aids *Coleogyne* in making travel in the desert difficult.

110. *Pentstemon ambiguus* Torr.

111. *Gilia subnuda* Gray. At Red Lake; growing on sand dunes.

(To be concluded)

PLANT NAMES AND THEIR MEANINGS–III

ROSCAEAE

By Willard N. Clute.

That great group of plants known as the Rosaceae or roseworts, has flowers of a pattern so typical that to mention them as roselike is sufficient to distinguish them and yet it is only in comparatively recent times that the word rose has come to have its present significance. In earlier days a rose might be any conspicuous flower. Botanical literature abounds in instances of such use of the term. When it comes to scientific names, however, rose, or rather the Latin *Rosa* derived from the Greek *Rhodos* has a very definite meaning. Used to designate the typical rose genus, it gives the name Rosaceae to the family and through it to the order Rosales. It is likely that the original rose was of some color between pink and red as indicated by our words rosy and rose-colored.

A number of common genera in the Rosaceae have been named for early botanists. Thus *Waldsteinia* was named for the Count of Waldstein, an Austrian botanist; *Sibbaldia* for Dr. Robert Sibbald of Edinburgh, *Kerria* for William Kerr, a collector in, but not of, China, *Dalibarda* for Thomas Francois Dalibard, a French botanist, and *Duchesnia* for Antoine Nicolas Duchesne, famed for his knowledge of strawberries and only doubtfully honored by having named for him a genus in which the fruits are insipid and showy rather than useful. *Gillenia* is said to have been named for one Gillen or Gillenius, an obscure German, though Wood would derive the name from the Greek *yelaw*, meaning to laugh, on account of its exhilirating properties. There seems to be a laugh concealed in the name, anyway, for Britton some time ago discarded *Gillenia* and named the group *Porteranthus* for Dr. T. C. Porter who was not born when the genus was first named!

There is some obscurity involved in the name of *Amelanchier*. Wood derives the name from *amelancier*, the French name of *A. vulgaris*. Gray says the name is barbaric and not satisfactorily explained, while Britton says it is the Savoy name of the medlar. The generic name *Spiraea* is also in question. According to Wood it is Greek for a cord or garland, but Gray says it means to twist, and refers to the twisted pods of some species. Bailey agrees with Wood and says the word was first used by Clusius.

Geographical names serve to distinguish various other genera of the roseworts. *Cerasus*, the name of the cherry, is from a town in Pontus whence came the garden cherry. The French, *cerise*, meaning cherry-colored, is evidently from the same source. The quince genus, *Cydonia*, is from Cydonia in Crete where the common species is native, while *Cotoneaster* is literally "quince-star" in New Latin and was given to the group from the resemblance of the species to the quince. *Cotoneum* was the Roman name for quince, but according to Gray the use of the term here alludes to the cottony covering of twigs and leaves.

The name of the hawthorn genus is from the Greek *krateos*, meaning strength, given, apparently, to this group because of its strong wood. Those who have attempted to identify the many forms into which modern taxonomists have divided the species might reasonably insist that the name is deserved for other reasons. *Potentilla* is from the Latin, being a diminutive of *potens*, meaning power. The name appears to have been given to these plants from their supposed medicinal properties. *Geum* is said to be from the Greek, signifying "to taste well," in allusion to the flavor of the rootstocks of some species. The name was used by Pliny.

The pear genus is *Pyrus* in the Latin but it is much the same in several other tongues, as for instance, *poire* in French, *pere* in Anglo-Saxon and *peren* in Celtic. Since the pear originated in central or northern Europe, it is likely that the Latin name was derived from the vernacular of the barbarians. According to Britton, the ancient Latin name for the pear tree was *Sorbus* and under this name is now often assembled the plants we know as mountain ashes. The generic name *Sorbaria*, is of course from the same source and indicates a resemblance in the leaves of the two genera. Another name derived originally from the Celtic is *Rubus* from *rub*, red, in allusion to the color of the fruit, though it is also said to be derived from the Latin *ruber* with the same significance. The title *Aronia* by which one section of the pear genus is often known, is said to be derived from *Aria* the name of the beam-tree of Europe.

Agrimonia is sometimes derived from the Greek *agros* field and *monos* alone from its medical properties which were of such repute as to render it alone in its field, but Gray says the word is merely a corruption of *Argemone*. The name of the Strawberry genus, *Fragaria*, comes from the Latin fragrant and is particularly well applied. Gray says the ancient Latin name was *fraga*. *Comarum* is the Greek *Komaros* meaning strawberry tree which the plant is said to resemble in fruit, though to say where the resemblance is would puzzle any botanist.

Alchemilla is said to be from the Arabic *alkemelyeh* and according to Britton was named for its fancied use in alchemy. *Sanguisorba* is from *sanguis*, blood and *sorbere* to absorb, the plant once being esteemed as a styptic and vulnerary. *Poterium* is the Latin for a drinking vessel. *Physocarpus* is

Greek for a pair of bellows and fruit, in allusion to the inflated capsules of some species. *Opulaster,* another name often used for this genus is from the same tongue and means wild cranberry tree. *Chamaerhodos* is Greek and might be translated "low or dwarf rose." *Filipendula* is from the Latin filum "thread," and *pendula,* "hanging," but does not seem to refer to the roots, as Gray asserts. *Aruncus* is a name used by Pliny for the goat's-beard. *Prunus* is the Latin name for the plum and accounts for the fact that the dried fruit is known as a prune. *Malus* was the Greek for apple and *Dryas* was named for a wood nymph, or dryad, the special protector of the oak.

Professor J. C. Nelson suggests that the "seal" in such names as "golden-seal" mentioned in the last number, may have the same significance as it does in "Solomon's-seal" where the allusion is to the branch scars. With reference to other species he adds: "If *Aquilegia* is from *aquilegus,* 'water drawing' as Gray has it in the 'Field, Forest and Garden Botany', might not the reference be to the shape of the spurs which remotely resemble those long water jars (*amphorae*) which the Romans used to stick in the ground? Might not 'Jack-in-trousers' have the same significance as 'Dutchman's breeches', referring to the shape of the spurs?"

Apropos of "blobs" mentioned among the vernacular names of *Caltha palustris* in the last number, Mr. C. F. Saunders notes that "blob" also signifies a bubble or blister and is not inappropriately applied to such globular flowers as those of *Caltha* and *Nuphar.* He further observes "I have always entertained the notion that popular plant names are frequently the work of children in whom impulse and fancy, rather than scientific observation, play the essential part." This is quite likely correct and yet many of the fanciful names of plants have come down to us from hoary antiquity and embody a great deal of folk-lore that is worth investigation. Moreover, children's names for plants often have a widespread use and thus deserve to be recorded. Finally, a record of all plant names will enable us to select the most appropriate for general use and ultimately to eliminate the less significant.

Mrs. Blanche H. Soth notes that the Hepatica is called "Paas blows" or "Paas blumes", meaning Easter flowers. This name was in common use among the early Dutch settlers of New York. She also suggests that the yellow centers of *Amemone pulsatilla* flashing out of the mass of blue-gray fuzz may account for the name of "Cat's eye" applied to this species, and "badgers" applies only when the flowers are peeping from the ground.

There seems to be room for another derivation of the name of "marsh marigold" or rather of marigold applied to the flowers of *Caltha*. Some writers would derive it from *marais*, a marsh, hence "marais gold" or in time "marigold." Additional British names for this plant are "yolk-of-egg" and "left-hand flower" the latter said to refer to the shape of the flower, like a shield. We have also overlooked one of the most poetic of the plant's names. This is almost certainly referred to by Shakespeare in the lines beginning " Hark, hark, the lark" when

"Winking Mary-buds begin
To open their golden eyes."

HARMFULNESS OF GENERIC CHANGES

We are all painfully familiar with the changes that are continually taking place in generic names, both of animals and plants. Such changes fall, roughly speaking, into two categories: (1) Cases where an older name for the same group is discovered in some overlooked work and is substituted for the one in general use. (2) Cases where a generic group is subdivided, the old name being restricted to one of the subdivisions and new names given to all others.

The first sort of change is necessary and is governed by a definite code of rules which is rapidly affecting international uniformity so far as such cases are concerned. The second set of changes, however, is entirely dependent upon personal opinion with no hope of uniformity or finality. Generic groups are separated from one another by all degrees of difference and there is no standard by which the amount of difference may be consistently measured. Consequently no two systematists will be in agreement as to how many groups may be recognized in any given family.

Ever since the time of Linnaeus, generic groups have been undergoing disintegration until in some families the ultimate condition has been reached of a generic group for each species. When this stage has been attained, we have lost all trace, in the scientific names, of any relationship whatever between species. The binomial name, in other words, has become useless and we might just as well have a mononomial. The very object for which the generic name was proposed has been lost. Why should we insist upon impairing our system of nomenclature by constantly changing the generic names every time we change our minds as to how many minutely different subdivisions we are going to recognize in the group?

The botanist has long known of the differences between the so-called flowering dogwoods and those without involucral leaves, but what profit does he gain by changing the generic name of the former to *Cynoxylon* compared to the loss which he inflicts upon the ornithologist, the entomologist or the student of general scientific interests who knew them under the name of *Cornus,* and who, unless they be Greek scholars—a rapidly expiring race, by the way—have no conception of what sort of herb, shrub, or tree a *Cynoxylon* may be? So, too, the unfortunate botanist who may have learned to know certain sparrows as species of *Ammodramus* fails utterly to recognize his old friends under the names *Thyrospiza, Ammospiza,* and *Passerherbulus.*

I am perfectly aware that the systematist who concerns himself only with questions of the number of species and genera and the names for the same in a single branch of science in which he specializes, will regard my remarks as pure rubbish. We must all admit, however, that specialization makes us blind to the views of outsiders and to some of the broader aspects of our specialty. Things that seem to us from long association necessary, may be found upon unbiased consideration susceptible of very important modifications, and the present problem seems to be one of these.—*Abridged from an article in Science, by Witmer Stone.*

NOTE *and* COMMENT

Length of Roots.—We seldom look very far below the surface in botany. Roots have so little of beauty that we commonly pay little attention to them unless they are edible. There appears, however, to be considerable diversity among the roots of different plants as regards external characters, though internally they are pretty much alike. Studies carried on in the West show very great differences in the area over which the roots of different species spread. Some, possibly most, occupy the upper two or three feet of soil, but the roots of alfalfa are commonly supposed to go down twenty feet or more in search of water, and those of *Lygodesmia juncea* of the Western plains have been found penetrating to still greater depths. The palm for such performances, however, must go to the buffalo berry (*Shepherdia argophylla*) which is reported to go down to depths of fifty feet or more. As regards total area covered, the roots of *Ipomea leptophylla* must be considered. The soil within the reach of this plant is often fifty feet in diameter and ten feet deep.

Berberis Aquifolia.—I am greatly interested in reading the introductory article in the February *American Botanist* concerning the *Berberis Aquifolia*, which seems to have degenerated in being removed to the "effete East" to what your correspondent calls a "colony of sprawling plants." Here in its native haunts it is a most beautiful shrub from four to ten feet in height. It is difficult for me to conceive why the name "trailing" Mahonia should be applied to this plant. According to our Northwest botanists (Piper, Howell) we have two distinct varieties of the Oregon Grape: the *Berberis aquifolia*, known to the common people (that is those not having botanical knowledge) as the wild holly, and *Berberis nervosa*, the common Oregon grape, which rarely attains a greater height than eighteen inches and has not the holly appearance of the other. I have both varieties growing in my garden. The leaves of the larger variety are pinnately veined and those of the smaller variety palmately veined. The fruit of one is much like the other and that of the smaller and more common variety is much sought after by housewives as it makes a most deliciously flavored jelly, only the berries must be picked early or they become wormy. I think the plant you picture in the *Botanist* is *B. Nervosa* and not *B. aquifolia*.—*C. E. Maxfield, Seattle, Wash.* [The "trailing" part of the name mentioned above is no doubt due to the fact that the species was once known as *B. repens*. Since *repens* may be translated as creeping, or trailing, the makers of our books seized upon this as a good "English" name. Such a proceeding illustrates the futility of trying to make a "common" name for every species whether it is commonly known or not. There is certainly no excuse for ever making an "English" name and there can of course, be no "common" names unless plants have such names by which they are commonly known. Familiar plants may, and frequently do have a number of *vernacular* names; that is names by which they are called in our mother tongue. Prof. Nelson notes that this plant is the State flower of Oregon.—*Ed.*]

MICROSCOPIC SPECIES.—It used to be possible to distinguish different species in a macroscopic genus by macroscopic characters, but the refinements of the species-splitters have been carried so far that it is now actually impossible in certain cases to identify big husky wildflowers unless one is equipped with a compound microscope! The gentleman who recently revised the genus *Allocarya,* observes that "In several of the groups, the species are not distinguishable by any evident superficial characters" and adds that the collector has often gathered several species, (presumably from the same colony), under one number. Several of the "new species" have been found only once. When one learns that the wrinkles and protuberances on the all-but-microscopic nutlets are the sole means of identification it is easy to understand how the author is able to "recognize" 79 species. The writer of this paragraph will engage to make more than that number of new species out of a quart of dried peas by using similar distinguishing marks and he will guarantee that several of these will come true from seed. However, if species can be made on the number and color of the stamens in the hawthorns, there is no reason why similar species may not be based on the reticulations of the fruits in *Allocarya*—though it may be difficult to induce field botanists to accept them.

PROLIFEROUS ROSES.—Last year, on an old rose-bush in our yard, there were some six or seven stems bearing three roses each, with about two inches of stem between each fllower. The first one would be a perfect pink rose, the one above it would have a green center and the top rose would be nearly all green. Some would have just a touch of color.—*Bessie Bloom, Kankakee, Ill.* [This is another illustration of the fact that all parts of the flower are morphologically leaves. In the green rose regularly offered for sale by nurserymen, the petals have all taken on leaf-like characters. The cause of such proliferations is not well understood, but occurrences of the kind are always worth recording.—*Ed.*]

AN UNKNOWN HONEYSUCKLE.—The illustration and description of an unknown honeysuckle published in the February number of this magazine has resulted in the discovery of its name. Dr. C. S. Sargent, Director of the Arnold Arboretum kindly informs us that the plant is *Lonicera Maackii* var. *podocarpa,* a handsome plant which was introduced into this part of the world by the Arboretum. It is said to be one of the best known and widely distributed species in Central and Western China. A query recently addressed to the U. S. Department of Agriculture with reference to the name of the plant elicited the reply that it had not been identified yet. The original plant in question was imported by the Department mentioned.

FLOWERS WITH EXTRA PARTS.—A correspondent writes that a Chicago iris grower has a plant of the form known as Madam Chereau with four parts in each whorl, instead of the conventional three and asks how such multiplication of parts is brought about. In reply it may be said that plants of this kind are "sports" and may occur in practically any species with a definite number of parts in a whorl. The trilliums are often found in this condition and in the Editor's grounds a race of four-parted Darwin tulips has been bred up from a single bulb that produced flowers with this characteristic. How to produce such sports is difficult to say. Those in commerce are commonly the result of chance finds and were not the object of experiment by the breeder. If one deliberately sets out to produce such "freaks" he would be most likely to succeed if he varied the surroundings of his plants as much as possible. No plant is perfectly adapted to its locality. It does the best it can under the circumstances. When it is brought into a new region, therefore, it naturally begins to adapt itself to the new conditions, and in this effort sports are often produced. In general, any change in the plant's environment —air, soil, water, light, or temperature,—is likely to result in more or less definite responses of the plant which may be sufficiently strong to make noticeable differences in its form.

PEONY MYTHS.—When it comes to the recording of myths, one never knows how much is really folk-lore handed down from antiquity and how much has been added by the narrator to make a good story. Peony myths, however, may have a rather more substantion basis of fact since Pliny, in the first century of our era, has recorded that the earliest known of medicinal plants was the peony. It is fabled that disguised as the physician Paeon, Apollo healed Pluto with his plant, in consequence of which the early physicians were known as *Paeoni* and the plant of course became *Paeonia* or peony. Apollo, being the god of light and healing, it is natural that a hymn in his honor should be called a paean. Another myth has it that Paeon was an actual personage and upon being put to death by his divine rival, Aesculapius, was changed into a peony by his protector Apollo.

FLOWERS AND SEX.—The commonest form of flower is that in which both stamens and carpels are present; in fact, this is regarded by the unbotanical as the only kind of flower. When any extended study of these structures is made, however, two other types usually appear—the monoecious, in which the stamens and carpels are separate and borne on different parts of the same plant, as in corn and the pines, and the dioecious, in which the two forms of flowers are still further separated by being borne on different individuals, as in willows and poplars. While these are the most conspicuous, there are numerous other forms among which may be mentioned perfect and staminate flowers on the same plant as in some umbelliferae, perfect and carpellate flowers on the same plant as in *Atriplex* and many Compositae, separate plants with carpellate, staminate, or perfect flowers as in some maples, separate plants with carpellate and perfect forms as in *Plantago lanceolata*, and separate plants with staminate and perfect flowers as in *Caltha*. There are also all gradations from completely perfect flowers to flowers that are either staminate or carpellate. Ten different forms have been found in the ash. According to a writer in the *American Journal of Botany*, more than ninety families of plants have species that show differences of the kind mentioned.

Heat and Fruiting.—It is a matter of common knowledge that plants must have light to make plant food, but according to two scientists of the Bureau of Plant Industry, U. S. Department of Agriculture, the fruiting of many, perhaps all, plants may be controlled by regulating the period of light to which they are exposed. It is reported that either too long or too short a period of daylight in comparison with the darkness may prevent plants from flowering or fruiting. In case the period of light is unfavorable, the plants may make a luxuriant growth but fail to fruit. A length of day that is favorable to both vegetation and fruiting is assumed to produce the "everbearing" varieties. It has been known for a long time that plants have three cardinal temperature points or zeros—an upper and lower zero beyond which growth ceases and a middle or optimum zero at which they thrive best. Frequently these zeros are different for the growing and flowering processes. Undoubtedly the upper and lower zeros are associated with temperature, but it may well be that the optimum point is determined more by light. In view of the experiments, one understands how apple trees may fail to fruit when taken to a warmer region, not because of the heat, but because the period of daylight is not favorable. A curious result of this rule is found in the case of the ragweed which is reported to require for flowering a stimulus that is afforded by the shortening of the days and lengthening of the nights. It does not come into flower until the period of daylight falls below 15 hours. In the latitude of Washington, that comes about July 1. But if ragweed seed should be taken to northern Maine and planted, the plants would not experience a length of day below 15 hours until about August 1. Therefore, they could not come into flower until after August 1 and, though the vegetative growth might be very rank, they could not mature seed before killing frosts intervened. The long days, therefore, make it impossible for ragweed to perpetuate itself in that latitude. On the other hand, plants that get their flowering stimulus from a long day could not perpetuate themselves through seed formation at the equator, where the day never exceeds 12 hours. This principle affords the clue to the fact that many plants grow most luxuriantly near the northern limit of their range. The long northern day allows them to attain their maximum growth before the shorter day intervenes to check vegetative growth and start the productive process. The migration of birds is also said to be explained by this theory.

BLUE AND YELLOW LUPINES.—I am sending you two lupines (*L. arboreus* and *L. Chamissonis*) which grew near each other on one of the beaches here, as being one of the few exceptions to blue and yellow species in the same genus. Grant Allen suggests that where yellow flowers are found among advanced genera, it means retrogression and the blossoms are rarely bright yellow, but generally buff or salmon. This I have found to be the case with the enclosed exception, which could not well be a brighter yellow. How do you account for it?—*Mary L. DeLange, LaJolla, Calif.* [There are a good many things about flower color not accounted for as yet because botanists have been more concerned with collecting and naming plants than they have in studying their life processes. Off hand one would be inclined to say that there is no reason why yellow and blue flowers should not be found in the same genus, except that it is not the fashion. There is a fundamental difference, to be sure, in the methods by which blue and yellow flowers are produced and which usually operates to keep each genus or closely related group of plants to its own color. Yellow flowers are colored by tiny grains called chromoplasts which are identical with the green grains or chloroplasts in every thing except color. Chloroplasts readily turn to chromoplasts and thus all flowers have within them the possibility of becoming yellow. One recalls, in this connection, how commonly the leaves turn yellow in autumn. It is the facility with which a yellow color is produced that makes so many of our flowers of this hue, and since yellow is so easily made from green, it is quite natural that the simpler flowers should oftenest have this color. That every yellow flower is a simple flower, however, is by no means true. The highest types of flowers in the world are the dandelions, hawkweeds, and their allies, and these are nearly always yellow. Blue flowers are due to a coloring matter in their sap which is not so very far removed from the ordinary blueing. Most blues are due to substances called anthocyanins, of which there are many kinds. Under certain conditions (acid sap, for instance) the blues may become pink or red, though most red flowers are probably due to chromoplasts. Since the possibility of developing yellow is ever present, this color may appear even in parts of otherwise blue flowers, as on a single petal, as a nectar guide, etc. It may be added that the yellow lupine is an exceedingly showy plant and well worth growing in gardens. It is offered for sale by some seedsmen, but appears to be difficult to germinate.—Ed.]

EDITORIAL

Readers of this magazine have doubtless noticed that the regular subscription price is now $1.50—that is, it is $1.50 to all new subscribers—but those already on our lists will continue to be billed at present rates as long as they remain subscribers. We take this occasion to say, however, that the tenth day after this number is issued will be absolutely the last day that those not on our lists can get on at less than regular rates. Those who complete their files within this period or who purchase the first 25 volumes, will be placed on the Patron's list and receive the magazine thereafter for 75 cents a year. Those who subscribe for two years in advance, at a dollar a year, and ask us to continue the subscription until ordered stopped, will be placed on the "permanent" list and get the magazine for $1.00. This is an excellent opportunity for annual subscribers to transfer to lists that will save them from 50 to 75 cents annually, but it is absolutely the last call.

* * *

There are some things about the publication of this magazine that it is desirable for our readers to know. Probably most important is the fact that every number now costs more than twice as much as it did five years ago. This difference in price has not been made up by an increase in advertising but must be made up by additional subscriptions. In view of the fact that we are carrying rather more than our share of the cost of production, we think it only fair to suggest that subscribers do what they can to recommend the publication to others. The magazine is published exclusively in their interests. And we especially request that remittances for subscriptions be sent in a form that represents 100% cash to us. An order for subscriptions accompanied by a check that costs 25 cents to collect is about as popular in this office as a button in the Missionary collection.

BOOKS AND WRITERS

It has been estimated that there are nearly eighteen hundred species of American plants which afford food for the bees. A large number, of course, are of small importance and serve merely to keep the bees busy when the plants which yield the main supply of nectar are out of bloom. Among the plants most important to the apiculturist are white clover, alsike clover, buckwheat, basswood, sweet clover, cotton, alfalfa, raspberry, milkweed, goldenrod, mesquite, cat-claw, and catnip. When the honey flow is good, the bees perform almost incredible labors. Cases are recorded in which single hives have gathered 72 pounds of honey in four days and a single colony is reported to have gathered 251 pounds of honey in twenty-one days. Nectar, however, is not the only substance that bees derive from flowers. The pollen is gathered from many species and the bees are just as likely to suffer from a lack of pollen as from a lack of nectar. For the apiarist to be successful, therefore, he must know considerable about the plants of his region. It is possible for a hive to secure enough nectar to carry on their affairs from almost any region, but if the bees are to return a profit to their owner, the item of bee pasture is an important one. In view of these facts, Frank C. Pellett, one of the editors of the *American Bee Journal,* has brought together in an interesting book all the honey plants known in America, listing them alphabetically under their common names and adding to each a description of the flowers, the relative importance of the plant to the bee-keeper, the quality of the honey made from it, the range of the species, and a vast amount of incidental information that the apiarist will find necessary to have and which should prove of interest to those who, to paraphrase a well-known injunction, have learned to love the bee and leave it on its stalk. The book is well illustrated and well printed, and is for sale by the *American Bee Journal,* Hamilton, Ill., for $2.50.

Hunting for new species is an activity that appeals to nearly everybody. The novice is delighted to find a species new to his locality, but as he grows older nothing will satisfy but the discovery of species new to science. Sooner or later, however, there comes a time when he has worn out his locality. In a trip of hundreds of miles from his home he will scarcely encounter a species which he cannot name at sight. His delight in plants thereafter is likely to come largely from considering them from the philosophical side; from discovering their relationships to their habitat and to other forms of nature. This is the last phase to which the naturalist comes, but in many respects it is the most significant. If he does not give up the quest until this stage is reached, he is likely to continue it until his last field trip is ended. It is obvious that worthy books on the philosophical side of botany must be rarer than those devoted to earlier phases of the subject. It is easy to write a manual or handbook but difficult, indeed, to produce that form of literature which we know as the essay. And yet our botanical literature will not have attained its fullness until many books of this kind have appeared. Our own writers have made a creditable start. Wilson Flagg, who is only a name to many, Maurice Thompson, John Burroughs, Henry D. Thoreau, and a few more recent writers come to mind, but they usually do this kind of thing better on the other side of the Atlantic—possibly because they have been at it longer. A volume that illustrates the ideas here expressed comes to us from the press of Edward Arnold, London. It is by Sir Herbert Maxwell, and is entitled "Memories of the Months," being the sixth in a series with this title. In it the author touches upon a multitude of things connected with Scottish natural history. Though various essays are arranged under each month, they are entirely separate as to subject, and the reader may browse about in the book much as he would go afield, stopping whenever fancy or interest dictates. After going through the 300 pages of this book, one is likely to wish for the others in the series. The book is for sale on this side by Longmans, Green and Co., New York, at $3.75 net.

Twenty-one editions of L. H. Bailey's "Nursery Manual" has been absorbed by plant propagators since its first appearance in 1891, and now comes the twenty-second, which has been entirely re-written to bring it into harmony with present day practices. This is another of the Macmillan Rural Science Manuals and, as might be expected, treats the subject of plant propagation in a most extensive and thorough manner. The fundamentals of the subject are comparatively few, but the methods based upon these fundamentals are many and varied. None however seem to have escaped the author. About half the book (225 pages) is devoted to a list of some 1500 trees, shrubs, vines, and herbaceous perennials, with specific directions for propagating each. In the first half of the book the general practices of nurserymen are discussed. As usual, a large number of illustrations aid in making the descriptions clear. The book is one that practically everybody who owns a garden will find useful. No matter what plant he may wish to multiply, he is certain to find the best methods described. While it claims to be merely a propagating manual, the book discusses the common insect and fungus pests and suggests remedies for their control. It sells for $2.50.

"General Botany" is a new book, by Hiram D. Densmore, recently issued from the press of Ginn & Co. The book is well written and well illustrated, but in content it differs so little from a hundred others that have gone before it that one wonders whether the schools will find a pressing need for it. As is usual, the first part treats of the structure and function of plant parts, the second part deals with the so-called "spore-plants"—mosses, ferns, and the like—and the third and final part discusses representatives of several of the better known plant families. The point in which the book differs most from its congeners is possibly to be found in the attention given to minute and technical details. As a complete and careful account of the plant and its activities, the book is above criticism; as a guide to the beginning student, one might reasonably suggest that it fails to sufficiently emphasize the salient points. As it is, these are lost in a maze of details. No reference to laboratory work is made, but it is understood that a laboratory guide by the author will be forthcoming. The illustrations, of which there are nearly 300, are excellent and do much to elucidate the text. The price of the book is $2.96.

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JOLIET, ILL.

Vol. 26. No. 3 Whole Number 126

THE AMERICAN BOTANIST

AUGUST, 1920

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JOLIET, ILLINOIS

The American Botanist

A Quarterly Journal of Economic & Ecological Botany

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DESERT TRUMPET FLOWER—*Datura Meteloides.*

THE AMERICAN BOTANIST

VOL. XXVI. AUGUST, 1920 No. 3.

Flowers now sleep within their hoods,
Daisies button into buds,
From soiling dew the buttercup
Shuts her golden jewels up
And the rose and woodbine they
Wait again the smiles of day.
—*John Clare*

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THE DESERT TRUMPET FLOWER

By Willard N. Clute.

IT is interesting to note how small a difference sometimes suffices to elevate a weed to the position of a prized flower or to exclude from our gardens some other specimen that seems at first glance to be equally desirable. Let any of the denizens of our gardens, however beautiful, develop a tendency to undue multiplication, coming up where it is not wanted and crowding its neighbors, and it becomes a pest to be rooted out forthwith. The toad-flax or butter and eggs (*Linaria vulgaris*) is a historic example of a flower that became a weed, but anybody who owns a garden can recall instances of similar nature. In some gardens it is the lily-of-the-valley, in others it is the live-for-ever. In my own recent experience the European mullein (*Verbascum pannosum*), the garden rudbeckia (*Rudbeckia triloba*) and the day flower (*Commelyna communis*) have shown that their room is better than their company.

On the other hand, some of our most delightful flowers have risen from the ranks of the weeds. Like a genius in a family of dullards, they rise to heights to which their more prosaic relations cannot aspire. A slight variation in the color of the flowers, the time of bloom, the size of the blossom, or the way it is borne may serve to distinguish a flower from its weedy family. This is largely the case with the desert trumpet flower or ghost flower (*Datura meteloides*) which, though closely related to the noxious jimson weed that is seldom mentioned except to be execrated, is an aristocratic species quite worthy of our admiration. With flowers and foliage that unmistakably suggest its plebeian congener, it nevertheless escapes weediness by a considerable margain. During the warmer part of the day it presents to the eye only a mass of cheerful gray-green foliage, but as the day declines there is a stir among the leaves and presently a number of great creamy-white flowers, like morning glories, with a violet tinted border, open and pour a strong and pleasing fragrance on the evening air. Some of these blossoms are ten inches long and more than six inches across—among the largest of American wild flowers. In midsumer the flowers close before the morning has passed, but in cooler weather they may remain open for more than a day. Shortly after the flowers close, the corolla falls, but the calyx is more tardily deciduous because it must first separate above the ovary, leaving the base as a sort of collar about the prickly fruit. This method of cutting off the calyx is unique in this genus, so far as I know, and always suggests the method by which the common portulaca and the plantain release their seeds.

It might be surmised that the opening of a flower as large as this must be attended with movements that are perceptible to the ordinary eye, and this proves to be correct. If one will take his stand near a flower-bud shortly before sundown, he may have the pleasure of seeing the blossom snap open. In the bud, the corolla is twisted into a spiral, like that of the morning glory, in a form known to botanists as supervolute, but with modifications all its own. The corolla parts which correspond to petals are first folded together, face to face, and then the five rays thus formed are twisted to the left but with their tips free, like the pinwheels of paper made to amuse children. In addition, the very shallow sinuses of the corolla are gathered up in the center of the flower and twisted in the opposite direction, thus appearing like a tiny five-pointed star at the entrance of the flower. Opening seems to be initiated by the sinuses which in time cease to interlock, and soon the whole flower unfolds with a visible movement. For some minutes it continues to grow larger, like the wings of some great moth, but the sinuses never quite outgrow the pinching they got in the bud and always appear in the flower as five tiny points alternating with the larger and slenderer projections which are the tips of the petals.

The desert trumpet flower is often regarded as being native to California and Mexico, but whatever its original home, it is now pretty widely spread over a good part of Utah, Arizona and New Mexico. Like the common jimson weed, it has medicinal qualities of some value, which fact is familiar to the Indians. Quite likely some phases of its distribution are due to their friendly aid. It is a familiar plant in the desert in the vicinity of the pueblo Indian villages growing by preference at the base of shelving rocks and opening countless new blossoms daily. The first time we saw it in abundance was on the morning of the snake dance at Walpi and the sight of its blossoms always brings back the remembrance of those snowy chalices clustering along the mesa and adding their perfume, like a new sort of incense, to the religious ceremonies of the Hopi.

NOTES ON COMPARATIVE REGENERATION IN ELODEA AND CERATOPHYLLUM

BY N. M. GRIER, PH. D.

WHILE quite unrelated from other standpoints, *Elodea* and *Ceratophyllum* have certain characteristics in common, namely a habitat in slow streams and ponds and somewhat convergent, if superficial, anatomical structure, as represented by the arrangement of their leaves in whorls. The latter may represent a response to the particular conditions under which they live, and from such a standpoint, a study of their comparative regenerative power may be of interest.

Certain observations on these two plants may be added as having relation to the data hereafter presented. Branching of the stem in *Ceratophyllum* is much closer than in *Elodea*, the great majority of the branches being but one node apart. In a few specimens, this distance may be greater, sometimes as much as 13 segments. During growth, the terminal bud of *Ceratophyllum* appears to frequently divide, producing untimately a forked terminus to that portion of the plant. This seems to be rarely the case in *Elodea*, which however produces what the writer has never observed in aquarium specimens of *Ceratophyllum*—adventitious or water roots. From the aspect of compensatory growth, the broader and closely distributed leaves of *Elodea* find their equivalent in the compound, divergent and threadlike leaf structures of *Ceratophyllum*.

Conclusions from a study of regeneration in the water weed, *Elodea canadensis*, Michx. as published in *The American Botanist* are largely derived from the table to be reprinted in this paper*. These indicate that sections of this plant consisting of 10 nodes represent the minimum size at which the activities of the parent organism are duplicated, since it was found that,

1. Sections of less than 10 nodes rarely produce vegetative buds of roots, except where the apparently localized bud and root forming regions are included in such a section. Such regions were found experimentally to occur approximately at every tenth node.

2. In pieces of less than ten segments, the advanced state in development of buds and roots resulted in the death of the parent section, presumably due to the withdrawal of nourishment from the stem of the latter.

Any remaining data concerning *Elodea* will be brought out later, and it need only be added that the experimental procedure followed with it was the same as will now be described for *Ceratophyllum demersum,* L.

By means of sharp, sterile scissors, the plant body of the latter was divided into 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 segments respectively and grouped as such, care being taken to cut above and below the leaves of each terminal whorl when possible to prevent the possibility of any damage to these. As in *Elodea*, the terminal bud of each stem was removed as closely as possible to the nearest well defined node, and the rest of the plant used up for cuttings of convenient sizes, according to the conditions of the experiment, before other material was utilized. Large branches were treated similarly as the main stems. Five cuttings of each were taken, and each cutting placed in a stender dish of appropriate size full of pond water. These experiments also extended about a month, and the

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*See Grier, N. M. "Regeneration in Elodea" *Amer. Bot.* 22:55, 1916.

results obtained in that time are best presented in the following table:

CERATOPHYLLUM

Group	No. Surviving Operation and Producing Buds	No. of Buds Formed in Group
I	5	5
II	2	2
III	5	10
IV	4	8
V	5	7
VI	5	6
VII	5	7
VIII	5	9
IX	5	12
X	5	17

The table of similarly obtained results from *Elodea* follows:

ELODEA

Group	No. Surviving Operation and Producing Buds	No. of Buds Formed in Group
I	0	0
II	1	1
III		1
IV		2
V	4	2
VI	4	3
VII	5	3
VIII	5	4
IX	4	4
X	4	4

From Group I, *Ceratophyllum*, we note that each segment seems capable of budding—a fact which fits in well with the prevalent method of branching. In the light of this evidence, it may well seem that the production of buds is conditioned largely by some extraneous physical stimulus, perhaps such as that administered in sectioning. Opposite to *Elodea* in the following respect is the conclusion that survival is not necessarily dependent upon a large number of segments remaining in the plant, as one segment pieces appear to live indefinitely. Buds from such pieces, however, do not grow as rapidly as those from material containing a larger number of whorls of leaves. Group II in *Ceratophyllum* seemed to have been taken from a dying stem, as only two of its members survived, each producing a bud. Moreover, this group when considered as a whole with the remaining ones seems to indicate that when a greater portion of the plant than one segment is left, something occurs to inhibit the development of most of the latent buds so that only those favored advantageously by light relation, protection given the rest of the plant, etc., appear to vegetate. An average taken from the table seems to show that pieces of 3-4 segments are also favorable for regeneration. If this last statement be made to contrast with the results obtained from the first group, it may be pointed out that since the plant as ordinarily found consists of many segments and branches, metabolism is probably sufficiently great in such a case to permit the full development of buds in every segment, thus accounting for the frequency of branches as stated. While buds may be formed negatively in relation to the light, in time they become positively heliotropic.

Both *Elodea* and *Ceratophyllum* have the fundamentally similar structural plan of a number of metamerically repeated parts, but we have the outstanding point that while the latter has retained the primitive power as found in many of the higher plants to produce buds at each segment, *Elodea*, a simpler Angiosperm has apparently lost such. *Ceratophyllum* has perhaps the wider distribution of the two, and possesses additionally a more brittle stem. Such a condition, when coupled with high regenerative power, may well serve the plant, for following attacks of aquatic animals, fragments great and small would be more easily transported by the water and thus account for the greater distribution. Thus these properties could be of use to the plant although the habitat of *Ceratophyllum*—slow streams and ponds—is such as would preclude the probability of any constant physical strain making such properties useful.

Washington and Jefferson College,
Washington, Pa.

WILDFLOWERS OF THE OREGON COAST

By R. V. Bradshaw

During the summer of 1919, I spent the month of July camping along the Oregon Coast. From Eugene to Corvallis and beyond, the most prominent wild flower was the herald of summer (*Godetia amoena*) which grew in dense masses along the roadsides. In the mountains, near the coast, the foxglove (*Digitalis purpurea*) was abundant. Above Newport, I made a shelter from the branches of the Douglas fir and lodge-pole pine, both of which were found on the hills extending back from the cliffs.

On the cliffs a tangled mass of shrubs made walking extremely difficult, save in paths which had already been made. The salad (*Gaultheria Shallon*) was the most common of these. Nowhere have I seen such large salal berries as those coast representatives bore. The evergreen huckleberry, (*Vaccinium ovatum*) was intermingled with the salal; however the berries were unripe, and I did not get a chance to try them, but they are said to make excellent pies. In more open places the kinnikinnick (*Arctostaphylos Uva-Ursi*) made a pleasing effect with its small shiny leaves and large coral-pink berries. Here and there the flaming Indian paint brush thrust its red above the lower shrubs. On the extreme edge of the cliff, the most typical seaside flower bloomed—the sea daisy (*Erigeron glaucus*). The leaves are mainly basal rather fleshy and pale green in color. The heads of flowers are usually solitary, the disk being about 2.5 cm. across, and the violet colored rays which are numerous are from 10 to 13 mm. long. The whole plant is some 25 centimeters in height. The disk flowers are of a dull yellow color and make an extremely beautiful contrast with the ray flowers. This plant always grows where it is wet by salty breezes of the ocean, sometimes at the edge of the dunes, often on rocky cliffs, but usually on high crags overlooking the ocean.

In the sphagnum bogs, near my camping site in a small ravine, the characteristic bog plants flourished. *Rhodendron californicum* showed only an occasional blossom, for the period of brilliance was past. The Labrador tea (*Ledum Columbianum*) was in flower and looked very pretty with its clusters of creamy blossoms and dark green revolute leaves. The bayberry was not then in flower, but grew tangled with the *Ledum*. On parting the shrubs in the small open places, I was pleased to find the white star-flower (*Trientalis arctica*) growing near the little creeping St. Johnswort and round leaved sundews. With these were the blue-eyed grass and yellow star-grass.

Once, on walking along the beach not far from Newport, I came upon a group of yellow sand verbenas, shore lupines and sea-rocket. The sand verbena is similar in general appearance to the other members of the genus. It has a perfume that no lily could ever hope to excel. It truly is a plant that one could never forget, after seeing it in its native habitat. The shore lupine resembles the other lupines, but it lies prostrate in the dunes. The sea-rocket (*Cakile edentula*) was noticeable chiefly on account of its peculiar shaped pods. The pink flowers are rather inconspicuous.

The grasses along the coast are very interesting. From afar, the tall spikes of the beach rye-grass (*Elymus arenarius*) stood out from the damp places along the edges of the cliffs, reminding one of cat-tails. The spikes however were too ripe to make good specimens. I found *Aira praecox*, or hair grass, growing nearly everywhere in the open. *Calamagrostis aleutica*, a truly magnificent grass with large gleaming panicles, grew in the ravines. Its relative, *C. Vaeyi*, a smaller plant with copper-colored inflorenscence, I found on Yaquina Head. The most common of the grasses in the dunes was *Poa macrantha*. When I saw it, the whole plant was about the color of the sand, for the spikelets had ripened.

One day I found a number of the plants of the thrift (*Statice armeria*) on a narrow ledge overlooking the ocean. Although the leaves and stems were withered, the paper like flowers were still pink. A little distance below, the cormorants were nesting in little rocky cavities of the steep side of the cliff. In some of the nests there were eggs and in others the newly hatched young.

My second camp was made in a canyon, through which a stream of ice cold water ran out among a thick mass of *Equisetum*. I called this camp, Camp Glehnia, in honor of *Glehnia littoralis*, which grew so abundantly there. Before I left, the canyon was aglow with the tall racemes of the fireweed.

These, then, are the flowers which I now remember, without taking out my note books, and from which I drew a wealth of inspiration and lasting pleasure. And, while typing this, above the evening wind, I can almost hear the beating of the breakers below Yaquina Head.

FLORA OF THE NAVAJO RESERVATION

By Aven Nelson.

(*Concluded*)

112. *Chrysothamnus Greenei* Gray. This plant formed hemispherical clumps two or three feet high which catch and hold the sand, making rounded mounds at many places in the desert.

113. *Abronia Torreyi* Standley. At Red Lake.

115. *Aragallus Lamberti* (Pursh) Greene. A loco-weed. At Red Lake.

116. *Ximenseia enceliodes* Cav. Same as 104. Marsh Pass.

118. *Plantago Purshii* R. and S. Red Lake.

119. *Sophia procera* Greene. Laguna Canyon.

120. *Ribes longiflorum* Nutt. Currant growing with No. 108 at Kit Seil ruin. Edible.

121. *Achillea lanulosa* Nutt. A fine yarrow near Kit Seil ruin. Only one colony.

122. *Symphoricarpos rotundifolius* Gray. Laguna Canyon.

123. *Gilia longiflora* (Torr.) G. Don. Marsh Pass and very common east of there. Flowers pale pinkish.

124. *Erigeron macranthus* Nutt. Handsome *Erigeron* in moist shades; Betatakin ruin.

125. *Gaillardia pinnatifida* Torr. At Laguna Canyon Kayenta and Walpi.

126. *Stanleya pinnata* (Pursh) Greene. Yellow Cleome. Laguna Canyon, Navajo Creek and elsewhere.

127. *Gilia aggregata* Spreng. "Tin-pi-ute", the Indian name. Marsh Pass.

129. *Allionia linearis Bodini* (Holz.) A. Nels. Betatakin.

130. *Prenanthella exigua* (Gray) Rydb. Ranchmen call this the purple sage, after Zane Gray. Betatakin.

131. *Geranium caespitosum gracile* (Eng.) A. Nels. The same as No. 29 but the flowers were deep pink. The plants gray in drier soil, were taller, etc. Kit Seil.

132. *Linum puberulum* (Engelm.) Heller. In cracks in horizontal rock faces at Marsh Pass. The petals are yellow and very evenescent.

133. *Mirabilis multiflora* (Torr.) Gray. In many places over the range; opening toward evening. Related to the four-o'clock and much like it in appearance.

135. *Rhamnus betulifolia* Greene. From Oak Creek Canyon. Collected for a *Viburnum.*

136. *Cleome serrulatus* Pursh. Characteristic and most abundant *cleome.* Pink.

137. *Adenostegia Wrightii* (Gray) Greene. A most abundant labiate on the range. Always looks as if it were just on the point of blooming, though in full flower.

138. *Townsendia strigosa* Nutt. Frequently abundant in the sand on the range. A plant with tiny daisy-like flower heads close to the earth.

139. *Helianthus petiolaris* Nutt. An abundant sunflower.

140.*Gutierrezia microcephala* Gray. One of the chief plants of the desert in many places. Has the aspect of a goldenrod, and forms clumps like No. 142.

142. *Chrysothamnus Greenei* Gray. This and No. 140 cover the desert for miles.

144. *Eriogonum cernuum* Nutt. Abundant on the range. This collected at Walpi.

145. *Monarda Nuttallii* A. Nels. Walpi.

147. *Munroa squarrosa* (Nutt.) Torr. var. *Lanata*. This cottony grass very common in many parts of the range.

148. *Croton texensis* (*Klotsch*) Muell. Croton. Wild doves feed on this plant's seeds in the fall. Antelope Springs.

149. *Tribulus terrestris* L. Keams Canyon along roadsides.

150. *Euploca convolvulacea* Nutt. A Boraginaceous plant. Very common for long distances on the plains, the flowers resembling those of the mountain laurel but very thin as if made of tissue paper.

151. *Chamaesaracha coronopus* (Dunal) Gray. Weed from Walpi.

152. *Agoseris parviflorum* (Nutt.) Greene. War God.

PLANT NAMES AND THEIR MEANINGS---IV.

ROSACEAE.—II.

By WILLARD N. CLUTE.

Some botanists incline to separate from the Rosaceae those species with plum-like, and apple like, fruits. When this is done, the latter group is often called Pomaceae from the Latin word for apple and the first group Drupaceae also from the Latin meaning an over-ripe olive. Modern terminology, however, inclines to the use of Malaceae for the apples and Amygdalaceae for the drupes or stone fruits. The latter term comes from the Greek for the almond tree.

The Rosaceae present many illustrations of the fact that in order to have a number of vernacular names a plant should be neither too well nor too little known. The peach, for instance, appears to have no common names except the one by which it is universally known. On the other hand, many species in such genera as *Crataegus*, *Rubus*, *Rosa*, and *Prunus* have no common names of their own and bear simply the vernacular appellations of the genera to which they belong with perhaps, some qualifying adjective descriptive of their haunts, color, size, or time of blooming. This is especially true of the genus *Crataegus* where the multiplication of species has gone so far that the common people cannot be expected to distinguish the separate forms. The thorns and fruits of *Crataegus* are so characteristic that allusion to one or the other is found in nearly every vernacular name. As a popular name for the entire group, "hawthorn" vies with "thornapple." The second term needs no explanation but it may be a surprise to many to learn that "haw" is a very ancient term for hedge, so that our plants are the thorns that grow in hedges or rather on the edges of fields and gardens. We still speak of "edgings."

Hawthorn thus has the better of thorn-apple as a classical name but in America at least, thorn-apple is the name in common use. A few of the more characteristic species of this genus stand out from the rest with sufficient distinctness to have acquired variations of the usual common name. Of these, *Crataegus crus-galli* seems to have accumulated the greatest collection. The long and slender thorns have gained for the plant the name of "cock-spur thorn," reflected also in the specific name, as well as "pin-thorn" and "thorn-brush." "Red haw" has reference to the fruits, which like the trees which bear them, have been known as haws from the earliest times. "Thorn plum" is apparently a name due to the failure of the common people to distinguish between two very distinct types of fruit. *Crataegus mollis* and *C. tomentosa* are also known as red haws and the latter is also called "pear thorn", "pear haw" and "thorn plum." "Black thorn" and "white thorn" applied to this species are more properly applied elsewhere. The first is sometimes used for *C. coccinea,* but it was originally the name of the European *C. oxycantha* while the black thorn is referred to *Prunus spinosa. Crataegus punctata* is known as the "dotted-fruited thorn" because the fruits are speckled with small dots, which are probably transformed stomata. The "fire-thorn" is now regarded as a *Cotoneaster.* The common name is a literal rendering of the specific *pyracantha.* "Evergreen thorn" is self-explanatory though the plant is not always covered with leaves in winter. "Christ's thorn" obviously connects it with the crucifiction but the accent should be on the fiction; it had nothing to do with the crown of thorns.

The genus *Prunus* is usually made to contain the peaches plums, and cherries. *Prunus Americana* and *P. nigra* are indiscriminately known as "horse-plum" and "pomegrante" or sometimes "plum granite." The first named species is also called "wild yellow, or red plum," "goose plum," "horse plum" and "hog plum." The adjectives are obviously intended to indicate inferior fruits. *Prunus Allegheniensis* is known as "Alleghany sloe," *sloe* being an Old World name for another kind of plum. *Prunus maritima* is the "beach plum" or "sand plum", common on the seacoast and in other sandy areas. *Prunus pumila* is also miscalled "beach plum." It is more properly "sand cherry."

Our native cherries are usually called wild cherries to distinguish them from those in cultivation. The name of "pin cherry," "fire cherry" and "bird cherry" belong by right to *P. Pennsylvanica*. The first alludes to the tiny fruits borne on long and slender stems and the second to the rapidity with which this species springs up in many burned-over tracts. "Bird cherry" and "pigeon cherry" indicate the attitude of the birds to them. Small as the fruits are and insipid as they may be to human palates, they are in high favor with the birds. "Dogwood" applied to various species of cherry is a term loosely applied to a variety of plants, whose fruits are of inferior flavor, especially in such genera as *Cornus*, *Rhus*, *Viburnum*, etc. The "choke-cherry" is *P. Virginiana*. Any one who has tasted the astringent fruits will agree that it is well named. The wild black cherry (*Prunus serotina*) is the "cabinet cherry" so called because of the use of its wood by the cabinetmaker. Whenever cherry wood is specified it is always from this species. The names of "rum cherry" and "whiskey cherry" also applied to this species may in the light of recent events soon become unmeaning. It may be well to record here, therefore, that the fruits and the liquids associated with them were formerly compounded into a beverage known as "cherry bounce" which is reported to be all that the name indicates.

The genus *Rubus* contains a variety of forms that, like those of *Prunus*, fall into certain fairly distinct groups. Those in which the drupelets forming the fruit come away together from the receptacle when ripe are commonly called "raspberries" or "thimble-berries" while those which do not are "blackberries." Of the latter, those which trail on the ground are usually called "dew-berries." The species in general are known as "brambles."

The typical red raspberry is *R. strigosus* and the black raspberry is *R. occidentalis.* Several of the species are known as "mulberries" especially *R. triflorus, R. strigosus,* and *R. odoratus,* though why the name of a typical tree fruit should be thus misapplied is a mystery. It is true that the fruit of the blackberry has considerable resemblance to that of the mulberry, but it is to the raspberries and not to the blackberries that the name is applied. *Rubus odoratus* is known as the "flowering raspberry" for the reason that it has more showy blossoms than the other species. The white flowered *R. parviflorus,* notwithstanding the specific name is still sufficiently conspicuous to be called the "white-flowered raspberry." The common name of "salmon berry" is said to be derived from the color of the fruit. A Western species with red flowers is said to bear the name of "salmon berry," also. *Rubus chamaemorus* is the "cloud-berry," said to be so named from its habit of growing in cold and elevated regions. It is also known as "mountain bramble" and "mountain raspberry." "Baked apple berry" refers to its taste but where it got the name of "knot" or "knout-berry" is difficult to say. The specific name, meaning "low mulberry," may possibly be the excuse for calling some of the species mulberries.

The typical blackberry is *Rubus Allegheniensis* more commonly known as *R. villosus.* From its erect habit it is often known as "high-bush blackberry." The dewberry is now known as *R. villosus* though it is more familiar as *R. Canadensis.* The common name refers to the fact that the plant is on the ground where the berries are wont to be covered with dew. This habit also gives it the name of "running blackberry." A southern form, *R. cuneifolius,* is known as the"sand blackberry." The latter is also called "brier berry." *Rubus triflorus,* a blackberry with much the aspect of a raspberry, is known as "bog-berry," "swamp berry," "running raspberry," "plum berry" and "pigeon berry," all names of obvious meaning. The term rose serves the true roses so well that our native species have practically no other names in the vernacular except as familiar adjectives may be added to distinguish the various species. The European species are called "hip-briers," "hip roses" or "hip trees," the word *hip* being an ancient name for the brambles (*Rubus*). "Brier rose" refers to the thorny stems. Any thorny plant in ancient days was likely to bear the name of brier, especially species of *Rosa* and *Rubus*, but the "brier" from which pipes are made is none of these but a thornless heath of Europe. The "sweet briar" is *Rosa rubiginosa* and refers to the odor of the foliage. The common name of "eglantine" is also derived from an ancient word for brier.

It is suggested by Prof. J. C. Nelson that the termination *aster* in *Cotoneaster* does not mean "star" but in merely a diminutive ending as in *Opulaster—Opulus* being the cranberry tree and *Opulaster* a genus that resembles it. *Malvastrum* is a name formed in a similar way. We followed Britton's Manual in our rendering of *Cotoneaster*. Doubtless Prof. Nelson is correct, though there is room for doubt since *Aster* also means a star. In the common names of *Hepatica triloba* we overlooked one that is current in parts of New England, namely, "blue anemone." This accords well with the facts for the plant usually bears blue flowers and was once classed with the species of *Anemone*.

CLEAVERS

By Lucina H. Lumbard.

Rough cleavers or clivers (*Galium asprellum*), with other species of the family, are common in the northern parts of both hemispheres. When our Colonial foremothers began to make Devonshire and other cheeses after the English style, they had as an ally the flowers of the white cleavers, which belong to the same genus as the yellow-flowered variety they had formerly used in the home land.

Homer tells us that when Ulysses and his meddlesome sailors made their unfortunate landing on the isle of the Cyclops, they found a number of large cheeses. These the giants had made with the aid of another species of cleavers to coagulate the milk. Our Pilgrim ancestors were delighted to find that the roots of a smaller white cleavers (*G. trifidum*) dyed red as had *G. verum* in Holland and the British Isles. The Indians also knew the value of these roots for dyeing a permanent red and dyed with it their porcupine quills and the fringe of fawn skins for their ceremonial robes.

The leaves of *G. aparine* were used by the Indians and by the old-fashioned (eclectic) school of medicine as a remedy for disorders of the kidneys and bladder. The leaves of *G. circaezans* have a sweet taste, like licorice, and were mixed with lobelia (Indian tobacco) and smoked, just as licorice has for years been used to flavor the tobacco of commerce.

The more or less rough and angled stems lean on other plants, such as the elder, the low wild roses, and even scouring rushes and meadow grasses. The plants derive their name from closely adhering by their hooked prickles, not unpleasantly, to everything in their way. Cleaver flowers are minute, white, numerous, and honey-sweet. They are pollinated by many small bees and flies. Ants, which are sometimes numerous in its habitat, find the route to its honey-pot a thorny path indeed!

NOTE *and* COMMENT

Dandelion Species.—According to a recently issued Flora of Sweden, there are 99 different species of dandelion in that country. Dandelions, as any thrifty housewife can assure us, present great variations in the form of leaves, but there seems room for a reasonable doubt that each form is a different species. If so, then the dandelion species of a few years ago has become a genus with a multitude of species. It has been well said that "species are judgments." It all depends upon who is doing the judging. One who works long with any species sees numerous differences in the forms composing it that the superficial observer does not perceive. The mother of twins usually has no difficulty in distinguishing the one from the other. One may find surprising variations in a single row of radish seedlings, but to call each a species would be absurd. Objections to such a procedure, however, do not arise merely from a desire to criticise. It does not take much discernment to see that if the mere naming of plants is put on such a basis that it repels the beginner who might otherwise be interested in it, the science is harmed rather than helped. Let the species-splitter and name-tinker make as many categories of closely related plants as he wishes, but let him also realize the rights of the public in his work and cease confusing the beginner, as well as the advanced student in other lines, by naming as botanical species every variation from the normal.

Cold Deserts and Dry Deserts.—When the desert is spoken of, one usually forms a mental picture of a hot, dry, sterile waste, but this is only one kind of desert, and possibly not the commonest. Desert conditions prevail when plants cannot get sufficient water for their needs. Some regions are deserts because the soil is actually lacking in moisture, others are deserts because the water present holds in solution salts or other substances that make it difficult for plants to absorb it. Finally, there are the cold deserts which are dry, not through lack of water, but because the water is locked up in the form of ice and therefore not available to plants. For nearly half of every year, the greater part of our country is a cold desert of such dryness that only a very limited number of plants can remain green the year around. The plants of such regions, however, have so long been accustomed to a period of dormancy due to the lack of moisture that something of this nature now seems necessary to keep the life processes running smoothly. It is well known that most plants require some check to their vegetative vigor to make them fruit well. Northern plants carried to southern regions sometimes fail to fruit at all because no check of the kind is experienced. It is otherwise with such plants carried to regions where a season of dryness prevails, for the dryness due to heat and lack of water has the same effect as cold and the consequent lack of water. This fact is of considerable commercial importance. In regions where the cold desert type occurs, a late frost may ruin the fruit crop of these plants which blossom early, such as the peach, while in the dry deserts, the danger from frost is slight and a crop is more likely to be made.

A QUEER BEE HIVE.—Early in May the writer, in company with Prof. Geo. H. Grinnell, of the Loss Angeles City Schools, made a hurried trip to Santa Catalina Island in quest of wild flowers for the annual exhibit of The Wild Flower Club of The Southwest Museum. Those who read the list collected on the trip last year will find most of the plants gathered on this trip. A thing of special interest was the root of a Chilicothe vine (*Micrampelis macrocarpa*) a vine that grows from an enormous root and bears spiny pods containing large oval or elliptical seeds. This root was on the side of a grassy hill and had become exposed. The inner part had decayed leaving a shell about one and a half inches thick surrounding a cavity something like 30 inches in its long diameter by perhaps 12 or more the other way which had at one time been occupied by a swarm of bees, as evidenced by the scraps of comb clinging to its inner surface. Its occupation by the bees seems to have had no detrimental effects on its vitality, as there was a more or less vigorous vine growing from it.—*Geo. L. Moxley, Los Angeles, Calif.*

AYRSHIRE ROSE IN WASHINGTON.—While attending high school in Vancouver, Washington in 1915, I became interested in a white rose that baffled all my efforts to determine it. There were none like it in the gardens of the locality, so I assumed that it was native, for it looked like a white form of *Rosa pisocarpa* in some respects. While I have, at present, only the specimens collected from a large bush which grew in low ground about three miles north of Vancouver, I have the distinct recollection of seeing a smaller bush growing in Vancouver a few blocks west of the High School. This one was on a parking. This year I went over my herbarium of Washington specimens, and I became curious again about the white rose; so I compared notes with Professor Nelson of Salem, Oregon, who thought it might be the same that he had collected at Salem. His rose, however, was double. I sent a speciment to him, but it was entirely new to him, so he sent it at once to Dr. Rydberg who wrote that it seemed to be the Ayrshire rose, which is common in cultivation in England and which is supposed to be a form or hybrid of *Rosa arvensis*, a native of England and Western Europe. My specimens appear to be only ones that have been collected from bushes naturalized in this country.—*R. V. Bradshaw, Eugene, Ore.*

FLOWER BUDS TWO YEARS OLD.—While I am not yet ready to give a decisive answer to your query about *Paulownia* in the last number of *Botanist,* it seems to me on an examination of the flower-buds on two very fine specimens in the State-House grounds here, as also of a specimen sent me by A. S. Hitchcock from Washington, D. C. that what really happens here is this. The inflorescence instead of developing from this year's buds, seems to form the previous season. The flower-buds that are now developing are on the branches of a panicle that is fully mature, and which undoubtedly belongs to last year's growth. This is very different from what happens in the case of *Catalpa* for instance, where the whole panicle develops from this season's bud; but strictly speaking, the *Paulownia* flowers do not take two *years* to develop. Like the flowers of most trees in this climate, the buds form one season and open the next, and the only difference is, that in the case of *Paulownia* the rest of the inflorescence forms in the previous season. But to confirm this the tree ought to be studied during the present season, and the formation of the panicle noted. I am free to say that I never noticed this phenomenon before, and am glad that you have called attention to it.—*J. C. Nelson.*

INDIAN TURNIP IN A NEW ROLE.—If the *Literary Digest* quoted a writer in the Troy *Record* correctly, our old friend *Arisaema triphyllum* has taken on new characteristics. According to this account, where, by the way, the plant is called Italian turnip, the juice is said to be intensely *acid.* Then it adds "It is a favorite food of the bear and is so bitter that it is a favorite woods trick to give a taste of the raw root to a tenderfoot." As most of our readers are aware, the juice of the Indian turnip is acrid but not acid, and has not a hint of bitterness in it. When a small piece of the corm (not "root") is chewed, certain small crystals or raphides penetrate the tissues of the mouth and thereafter for a long time cause a sensation like an electric shock whenever the tongue, lips or cheeks are moved. The most interesting thing about this item is that the misstatements got by editor, compositor, and proof-reader. Doesn't the modern New Yorker know anything about the woods and fields any more?

REMEDIES FOR POISON IVY.—It is thought that there are fully as many remedies against ivy poisoning as there are for curing a cold. W. L. McAtee who has made a collection of the ivy remedies claims, in the *Medical Record*, to have found 244. Among those of botanical interest recommended to be taken internally are extracts of infusions of sweet fern, snakeroot, pasque flower, aconite, spice bush, coffee, poison sumach, pipsissewa, yellow jasmine, belladonna, and bryony. Poison ivy probably has a reputation for harmfulness all out of proportion to its abilities. A few people are rather severely poisoned by it but the majority seem to be immune or nearly so. The plant is common over at least a million square miles of our country, yet cases of severe poisoning are almost as rare as similar cases of poisoning by lady's slipper and other plants not ordinarily considered harmful.

MEANING OF PENNYROYAL.—A correspondent asks for the meaning of the name pennyroyal. According to the only information we have at hand, the word is a corruption of *puliall* royal, in which *puliall* is itself a variant of *poliol*, a diminutive of the Latin *Puleium* or *Pulegium* by which the European pennyroyal (*Mentha pulegium*) is known. It seems quite likely that pennyroyal may have been derived from *puliall* alone, and if not, it would be interesting to know how the term royal became a part of it. If our readers can add anything further in explanation, we shall be glad to hear from them.

DOMINANCE OF DOUBLE FLOWERS.—When two different kinds of flowers are crossed, they may indeed produce a composite progeny with characteristics of both parents, but usually the first generation resembles one parent to the exclusion of the other. In the new generation, therefore, some characters may appear to be lost, but they are really only latent and appear in the next generation in very definite proportions. When any particular character fails to appear after a cross, we say that it is latent or recessive while those that do appear are dominant. In various experiments in crossing double and single flowers, the astonishing fact is brought out that in some cases doubleness is dominant to singleness; that is, in certain flowers the tendency is to be double rather than single. This is all the more remarkable since flowers in the wild are never naturally double. Dominance of double flowers is said to occur in species of *Mimulus, Campanula, Althaea, Portulaca,* and carnations.

COLOR IN PORTULACA.—The common garden plant known as portulaca or rose moss ranges in color from white and yellow to red or magenta. A Japanese, Kono Yasui, who has been experimenting with the flowers finds that the magenta color may be produced by crossing the white and pale yellow flowers. It appears that white flowers possess a generator of magenta pigment (chromogen) but that this fails to act unless stimulated by the pigment of the yellow flowers; hence when white and yellow flowers are crossed, magenta flowers result. Several other pigments are found in the flowers of this species and serve to give them their characteristic colors. There are reported to be two pigments in the scarlet flowers and two others in the deep yellow ones. All the pigments, it may be said, are similar in chemical composition and differ just enough to make a distinction in each case necessary. That yellow flowers crossed with white will produce magenta specimens has been shown to be true of the common four o'clock and the snapdragon. Possibly other plants with flowers of the appropriate colors may be found to act in the same way. Magenta is one of the commonest of flower colors and apparently easily produced. A still more remarkable case is on record in which two forms of white flowers produce scarlet ones when crossed.

Buds of the Lilac.—It is a common belief that plants put on their buds in spring, the noticeable swelling of these objects in early spring being mistaken for their initial appearance. As a matter of fact, new buds begin to be formed almost as soon as the old ones have opened. By midsummer, the buds of most trees are well developed and the practice of budding is usually carried on then. Other species, of which the common lilac is a conspicuous example, form their next season's buds still earlier. By the end of May the lilac has finished its season of growth, so far as the elongation of the stem and the production of buds is concerned, and the summer seems to be spent waiting for a new spring.

New Use for Yeast.—The longer we study the physiology of the human body, the greater the wonder becomes that our race has survived to the present. Once we ate what pleased our palate but now we are expected to worry over carbohydrates, fats, proteins, calories, enzymes and what not. Lately it has been discovered that vitamines are the things that keep us on the job. We may be fat and rosy but scarcely healthy unless we are daily surrounding a sufficient amount, or number, of vitamines. Children are said to thrive best when their diet includes orange, carrot, or tomato juice because of the vitamines they contain. It turns out, however, that the humble yeast cake contains a vitamine quite superior to any of the others for warding off disease and thus yeast becomes an almost necessary article of diet. Dr. Leonard K.

Hirshberg says that yeast and orange juice are among the most important articles of diet for infants. When the new food is generally adopted, we may speak in quite a new sense of the rising generation.

BALD EAGLE THREATENED.—The bald eagle, the symbol of our country, is rapidly on its way to extinction. Long ago it disappeared from the more settled regions but until recently it existed in considerable numbers in the wilder parts of our country. In 1917, however, the Territorial Legislature of Alaska offered a bounty of fifty cents for each eagle killed and by April, 1919 this had resulted in the killing of 5600 eagles. One is inclined to wonder what kind of an individual it is who would be willing to exterminate this fine bird at fifty cents a head. A committee looking toward the future protection of the eagle has been formed and we trust may succeed in their efforts before there are no more eagles to protect.

ZYGOMORPHIC FLOWERS.—What the systematist calls an irregular flower is usually termed a zygomorphic flower by the morphologist. In either case we have been accustomed to form a mental picture of a flower some of whose parts are unlike other parts of the same origin. The most familiar forms are those which the petals are of different sizes or shapes resulting in labiate or papilionaceous corollas such as are found in the mint, figwort and pea families. Such flowers usually face sidewise on the stem and are adapted to the visits of large insects. As to the exact definition of zygomorphic flowers, even the authorities differ. Originally this type of flower was defined as one that could be cut into two exactly similar parts in a single plane only. If one recalls the structure of a sweet pea, snapdragon, larkspur or nasturtium, he will appreciate the fact that a cut in only one direction will separate the flower into similar halves. But what about the bleeding heart and iris? Are these zygomorphic flowers? They are very frequently regarded as zygomorphic but they are not, according to our definition; they are quite regular. Sometimes, however, the definition is extended to include flowers that may be disected into halves in more than one plane but here we crowd the conception of the regular or actinomorphic flower. The iris and bleeding heart, however, look so much like zygomorphic or irregular flowers that they are often so designated without a protest from the botanist.

BOTANIZING MARTINS.—On various pages of this magazine we have recorded instances of birds which deck their nests with flowers. That the common purple martin also has this habit appears to be overlooked. During the flowering season of the peach, a colony of martins in the editor's garden were busily engaged in carrying peach petals into their nesting boxes and when these failed they turned their attention to the leaves of the Chinese poplar and soon completely defoliated several of the leading shoots. Their method with the long flexible twigs of this tree is to alight near the tip and then as it bends down with their weight, to hurriedly snatch a leaf and get away before being upset.

THE VEINING OF LEAVES.—Only two of the great groups of plants have true leaves. These are the Spermatophytes, or flowering plants, and the Pteridophytes or ferns. In the Spermatophytes, the two divisions, monocots and dicots have each a separate and distinct kind of veining, and the veining of ferns is different from either. It is customary to distinguish these forms by saying that the venation of ferns is forked, that of monocots is parallel, and that of dicots is netted, but this is far from correctly expressing it. In the netted pattern, for instance, each group will be found to have numerous species in which the veins form a conspicuous network. The student of ferns who relies upon the conventional description of fern venation may be quite embarrased to find in any good fern collection that perhaps half of the specimens have netted veins instead of the forked veins he expects. Notwithstanding the occasional similarities of venation, however, the leaves of ferns, monocots and dicots are usually easy to distinguish. The difference is not solely in the disposition of the small veins. Along with the characteristically netted or irregular venation of dicots, goes a tendency of the leaf to have several series of veins branching off from one another in a descending order of size and this is the only plant group to be so characterized. In each of the others there is a main vein extending through the leaf with the smaller veins in marked contrast as to size. In dicots the small veins usually form a network with their tips free, in the monocots they may form a network but their tips are seldom free. In the ferns, a network may occur, but if the tips of the veins are free they often end within one of the meshes formed by other veins. In other specimens, however, the veins fork and fork again with no signs of a network.

IDENTITY OF MARIGOLD.—The common people mixed things up considerably when they gave the same name to plants of very different appearance or origin. The point comes up in connection with the name of marigold. A correspondent challenges the statement that Shakespeare referred to the marsh marigold (*Caltha palustris*) when he wrote of "winking Mary-buds." The Standard dictionary refers "Mary-bud" to marigold but considers the latter to be what is commonly known as the pot marigold (*Calendula officinalis*). Neither this species nor the African marigold (*Tagetes erecta*), nor yet the French marigold (*Tagetes patula*) is native to Shakespeare's country and it seems scarcely likely that the poet would have included a garden flower in his picture of the lark rising from the dewy fields. It would sems that if any marigold is meant it should be the marsh marigold which is common in England. To the writer of these lines, however, it seems more likely that some species of buttercup was intended. Anne Pratt, author of the "Flowering plants of Great Britain" also inclines to this view, but the majority of Shakespearian scholars are in favor of *Calendula.* One piece of evidence seems to have been overlooked. The poet makes his marigolds "Ope their golden eyes." Now the question is, which of these plants close at night; or was the opening an assumption on the part of the poet?

MOUNTAIN-CLIMBING LADY-BUGS.—In July 1920, the editor of this magazine found on the summit of Sunset Mountain near Flagstaff, Arizona, several quarts of the small black-spotted red beetle, familiar to everybody as the lady-bug or lady-beetle, congregated under some loose rocks. Since the mountain is a volcanic cone consisting mostly of loose ashes and bare of vegetation, the presence of the insects in such elevated regions was so unusual that the puzzle was turned over to the American Musuem of Natural History for solution. In reply Associate Curator Frank E. Lutz writes: "I cannot answer your question as to why they congregate in this way except to say that they apparently do it for the sake of hibernating. I am not sure how many of these thousands successfuly pass the winter but they probably succeed fairly well, otherwise the habit would probably have been lost years ago. Horticulturists of California collect these masses by the ton, put them in cold storage until wanted, and distribute them among the farmers at the proper season for controlling aphids." The species found on Sunset Mountain bears the name of *Hippodamia convergens.*

AMPHICHROMY IN HEATHER.—The Kew Bulletin reports a specimen of the heather (*Calluna vulgaris*) which bears both purple and white infloresences on the same plant. Cases of albinism are common in many species, but it appears to be rare for a single plant to bear both normal and albino flowers. Other cases are known, however. The cross between the purple-flowered alfalfa (*Medicago sativa*) and the yellow-flowered *Medicago falcata* results in individuals that may bear yellowish-white, deep yellow, lilac and greenish-violet flowers.

Colors of Aster Florets.—It is interesting to notice how each species of aster changes the tints of its disk florets. Late in the season I chanced to look closely at the heads of *A. ericoides* and observed that the little flowers are in bud when they are bright yellow; as soon as they open they begin to darken and eventually are red-brown. The disk buds of *A. Lowrieanus* are cream color and become purple when full-blown florets. Is it a sign to tell the bees that they are past being a storehouse for visitors? I brought some into the house and the yellow buds of *ericoides* opened and yellow florets were to be seen; the pale buds of *Lowrieanus* gave way to pale blossoms. Apparently the flowers refuse to change their hue if the pollen is not brushed away.—*Nell McMurray.*

EDITORIAL

This number has been delayed by the absence of the editor on another trip to the Painted Desert. Since a large number of our readers have also been away on vacation we trust that they will appreciate the situation and overlook our failure to appear on time.

* * *

The students of pure botany are not the only ones who are having trouble with questions of nomenclature. The Chairman of the Nomenclature Committee of the American Gladiolus Society said at a recent meeting that it was once supposed that there were 1600 different varieties of peonies, but when the different sorts were assembled at Cornell it was found that there are less than 500. All the others are apparently mere names. One variety was found listed under eleven distinct titles. The lists of varieties of peonies, irises, gladioluses, dahlias—in fact of almost any flower that has been "taken up" by the florist—are much too long. To distinguish the desirable forms, it has been suggested that trial grounds be established in which new forms may be tested and, if worthy, named by competent authorities. Something of this kind is badly needed to protect the general public from imposition, also. When one has paid a good price for a specimen he already has, under another name, he is likely to lose confidence in nurserymen generally, to the great disadvantage of both parties.

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It is likely that most, if not all, of our readers believe in some form of evolution and they probably imagine that all the civilized world holds like opinions, but this is an error as the following quotation, reprinted from *Science* which abstracted it from the *Bulletin* of Wheaton College, will show:

"Our former biology teacher, because of a change in view or for some other reason, was teaching the doctrine that human beings have descended from animals. This not being the belief of this college which accepts the Bible account of creation in all its details, she resigned her position and her resignation was accepted. God sent us in a very definite manner Professor S. J. Bole, an A. B. from the University of Illinois, who was for nine years instructor in the Illinois State University but whose religious views were positive and clear and made him desirous of a change. In view of the general situation among university men, we consider his coming to us distinctly providential.."

BOOKS AND WRITERS

Harriet L. Keeler has rounded out the growing year by a new book devoted to the autumn wildflowers which bears the title "Our Northern Autumn." In the same series have previously appeared "Our Early Wildflowers" and "Wayside Flowers of Summer." The latest volume aims to make the reader familiar with the common flowers that bloom toward the end of the year, but it is more than a "how to know" book and contains much in the essay style which bears on the general subject but which is not connected with the identification of species. The author ought to give us still another book of observations and impressions suggested by the passing seasons, a field as yet practically untouched but one that is sure to yield important returns when worked. "Our Northern

Autumn" is uniform with the other volumes. It is illustrated with pen and ink drawings by Mary Keffer, by numerous full page plates from photographs and eight colored plates. The book is issued by Charles Scribners Sons at $1.75.

A well recognized feature in the identification of the mushrooms is the color of the spores which ranges from pure white to various shades of red, yellow, brown and black. Another set of distinguishing marks is found in the presence or absence of a volva or cuplike base, the shape of the cap, the character of the ring about the stem, and the form and attachment of the gills. It has occurred to Louis C. C. Krieger that a simple and workable key to the mushroom genera may be constructed by making five horizontal columns to represent the different spore colors and crossing these with a sufficient number of vertical columns to indicate the structural differences. All that one needs to know, therefore, is the spore color of his specimen. Running along this column until he comes to the proper vertical column, he finds in the rectangle formed by the two columns the name of the genus to which the plant belongs. All this is presented in a single chart about fifteen by twenty-four inches in size and containing 90 spaces. There are, of course, a number of spaces in which there are no names because Nature did not see fit to make species with the appropriate characters, but in view of the immense number of forms that she has made we may reflect with gratitude upon her forbearance in this particular. Each genus in the list is illustrated by an outline drawing of a characteristic form and it would seem as if nobody could go astray as far as the genus at least is concerned. The Key is bound in board covers and is for sale at $1.00 a copy by the Norman Remington Company, Baltimore.

Dr. L. H. Bailey has begun issuing a series of papers under the general title of "Gentes Herbarium." The first number is devoted to an annotated list of plants collected by Dr. Bailey in China in 1917. This covers nearly fifty pages. Among the plants listed are 20 new species, 15 new varieties and various new combinations of names. A number of the interesting finds are illustrated. In addition to the scientific information conveyed, the publication is of interest for the number of common weeds listed. The Chinese gardener is bothered with the purslane, chickweed, curled dock, mouse-ear chickweed, several smartweeds, pigweeds, sorrel, butter-cup, shepherds purse, pepper grass, and many others less well known but fully as pestiferous.

The mention of yeast usually suggests that pasty square purveyed by the corner grocery and used in bread-making and in other popular but forbidden American indoor sports, but the term is far more inclusive. There are more than five hundred species of yeast; the kind used for making bread is only one of the number. Several yeasts used in beer making have been cultivated in a pure state for hundreds of years. Of the others, a large number, of course, are found in wines and other fermented beverages, but they may occur almost everywhere—on the soil, floating in the air, in the interior of potato bugs, in the human intestines, in the lungs, in cheese, raw sugar, milk, sour kraut, and in many skin diseases, including cancer. Under the microscope yeasts are recognized as oval or spherical bodies of minute size which ordinarily reproduce by putting out small projections of the protoplasm known as buds. The buds ultimately separate and form new plants. Under special conditions, yeasts form within their cells, small bodies known as ascospores and such spores may also be formed by the conjugation of two separate cells. When yeasts were first studied they were thought to be the reproductive bodies of various fungi. This seemed especially plausible since yeasts, themselves, may form chains and ribbons of cells which are very similar to the plant bodies of various fungi. The yeasts, however, are now known to be entirely distinct organisms. Books devoted to the yeasts do not appear to be very numerous. One of the most important is a work in French by Alexandre Guilliermond which has recently been translated into English by Dr. Fred W. Tanner of the University of Illinois, who has added much original matter in order to bring the treatment of the subject up to date. The first part of the book is given over to a discussion of the morphology and physiology of the yeasts with a description of methods for cultivating and identifying the various forms, but a much larger part is devoted to a description of all the species with notes on their occurrence, and other pertinent matters. There are more than 150 line drawings and a most comprehensive bibliography, the latter covering thirty pages. Now that the use of yeast in medicine is increasing the book bids fair to become one of the "best sellers." In any event, if one seeks information about the yeasts, this is the place to look for it. The book is for sale by John Wiley & Sons, New York at $6.00

Effie Young Slusser, Mary Belle Williams and Emma Burbank Beeson have collaborated under the direction of Lillian McLean Waldo, in a little book entitled "Stories of Luther Burbank and his Plant School." This is intended as a book for the use of nature-study classes in the grades, but certain parts, at least, are scarcely suitable for this purpose. It does not seem to be good pedagogy to teach even by implication that plants converse among themselves or that they are endowed with a multitude of human attributes. In an introductory note, Luther Burbank states that the authors have confined hemselves strictly to facts, but we feel disposed to question many of them. In the reviewer's part of the world, at least, tulips are not planted in the spring, the flower spike of calla lily is not a flower, the poppy seed capsule does not reverse itself in order that the seed may drop out, all wild amaryllises are not unatractive in color, the seed is not a plant egg, the first generation after a cross does not produce a multitude of forms, nor do the plants respond to suggesed improvements or strive to please the improver. It would seem as if the exact facts about plant improvement might be sufficiently wonderful without attempting to enhance them by exaggerated statements. In writing books about plants for the instruction or entertainment of children, an author should possess sufficient botanical knowledge to enable him to distinguish the important from the unimportant, the marvellous from the commonplace, and the truth from attractive fiction. There are too many writers to whom an unfamiliar flower is the only one of its kind, the originator of a new form is a creator, and the working of natural laws in plant growth nothing short of magic. The book we have noticed is well and entertainingly written and should interest the audience for which it is intended, though there are some statements that clearly need to be modified. There are a number of good illustrations, eight of which are in color. A portrait of Burbank forms the fronticepiece. The book is issued by Charles Scribner's Sons, New York, and costs, cloth bound, 85 cents.

A perusal of Charles Francis Saunders' "Useful Wild Plants of the United States and Canada" is likely to confirm the impression held by botanists that there are very few plants of this kind not in cultivation that are worth taking into our gardens. At the same time we perceive that the woods and fields abound in plants of lesser economic importance from which we could undoubtedly produce useful substances were our present supplies to fail; indeed, in times of scarcity, several of the wild plants might be depended upon to sustain life for a long time. In the list of edible stems, however, we note several that are American by adoption only, such as the dandelion, water cress, dock, and chicory. One of the interesting features of the book is found in the fact that it covers the entire United States and does not stop, as so many others do, at the banks of the Mississippi. We thus have references to the Florida arrow-root (*Zamia*), the Western Indian bread-root (*Psoralea*), the Northwestern bitter-root (*Lewisia*), in Indian bread (*Pachyma*), and many another whose name may be unfamiliar, in one and the same volume. The value of the book, however, is not so much in the number of species named as in the very comprehensive style in which those named are discussed. We are told how the aborigines and the early settlers prepared and used the plants and what species they found most useful, not only as food, but for beverages, fibers, soaps, candles, and medicines. Along with this go popular descriptions of the plants, in addition to much pleasant comment on a variety of features germain to the subject. A large number of the plants mentioned are illustrated; some by photographs and more by very creditable drawings. The book is published by Robert M. McBride & Co., Union Square, New York, and costs $3.00 net.

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Vol. 26. No. 4 Whole Number 127

THE AMERICAN BOTANIST

NOVEMBER, 1920

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JOLIET, ILLINOIS

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A Quarterly Journal of Economic & Ecological Botany

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ALPINE SPRING BEAUTY—*Clatonia megarrhiza*

THE AMERICAN BOTANIST

VOL. XXVI. NOVEMBER, 1920. No. 4.

November woods are bare and still,
November days are clear and bright;
Each noon burns up the morning's chill
The morning's snow is gone by night.
Each day my steps grow slow, grow light
As through the woods I reverent creep
Watching all things lie down to sleep.
—*Helen Hunt Jackson*

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THE ALPINE SPRING BEAUTY

By Mrs. Blanche H. Soth.

THE alpine spring beauty (*Claytonia megarrhiza*) is one of the few plants that bloom among the rocks on the very tops of the highest peaks of the Rockies. It often appears to be spread out in mats upon the bare rocks but closer examination shows that the large tap-roots are growing in the crevices and pockets through which they writhe and twist to great depths. The fleshy, long-petioled, root-leaves are rounded in outline and they spread out from the crown in large rosettes from which ascend many one-sided racemes of delicate white, pink-veined flowers.

This plant is remarkable among Claytonias from the fact that the two linear stem-leaves are alternate instead of opposite. The blossoms are large and look much like the spring beauties of the Mississippi valley. In spite of the delicate appearanre of the flowers and the succulent character of the plant, snow and frost do not harm it. It is often in full bloom close to the melting snow and emerges from the occasional summer blizzard even brighter than it was before.

PLANT NAMES AND THEIR MEANINGS---V.

ROSACEAE—III.

By WILLARD N. CLUTE.

ONE of the conspicuous trees of Eastern woodlands in early spring is *Amelanchier Canadensis.* Its snowy flowers borne in profusion just as the buds of other trees are bursting make it visible for long distances and bring it to the attention of many who would not otherwise think of it. Moreover, its blooming is held to be coincident with the appearance of the first shad in the coastal rivers and thus it is well known under the common names of "shadbush," "shad blow" or "shad flower." Again, in early summer the tree becomes prominent by reason of its edible fruits, like tiny apples, which appear in as great profusion as the blossoms do. These are highly regarded by the birds and not to be despised by human palates. The common names of "Juneberry," "June Plum," "Indian cherry" and "May cherry," are thus of obvious meaning, while "juice plum" is manifestly a corruption of "June Plum." "Sand cherry" is a name sometimes given to the plant from its habit of persisting in sandy places, and "Indian pear", "currant tree, "sugar plum," "sugar pear," "sugar berry" and perhaps other names may be current in restricted localities. All bear the ear-marks of having been made by uneducated people for the fruits are neither berries, pears, cherries, nor plums. They are, in reality, small apples or pomes. The name of "bilberry", misapplied to the tree, is still somewhat nearer the botanical mark, for the fruits do greatly resemble those of the true bilberry or European whortleberry (*Vaccinium myrtillans.*) The name of "boxwood" alludes to the white close-grained wood, while "service berry" is apparently imported since this name does duty in the Old World for *Sorbus domestica.* The word "service" seems to have been derived a long time ago from the Latin generic name *Sorbus* now borne by the mountain ashes, near relatives of the Amelanchiers. The fruits were originally called *ser-ves,* that is, services berries.

The mountain ash genus is common to both Europe and America and the species are so much alike in appearance that European names have been freely applied to our species. We commonly speak of our plants as "mountain ashes," from the shape of their leaves like those of the common ash, but in Europe "rowantree" is preferred and this name is occasionally heard on this side also. It is reputed to have been derived from *runa,* a charm, since it is well known that the European species anciently shared with the holly, elder, and mistletoe, a reputation for magic qualities. "Witch tree" is therefore naturally one of its appellations while "round-wood" is another form of "rowan wood." The fruit of the American plant is sometimes known as "dogberry," just as many other attractive, but inedible fruits are. By rights, this latter name belongs to the fruits of the genus *Cornus.* In view of what has been said under *Amelanchier,* the name "service tree" applied to this plant must be intelligible. An Indian name for the American species is reported to be *moza-mize,* hence "missy-moosey" which doubtless represents the attempts of pioneers to follow the Indian rendition. "Elder-leaved mountain ash" and "elder-leaved sumach" are other names for the plant which probably have little meaning at present.

The *Aronias* are pretty generally called "choke-berries." The name is especially appropriate, as anyone who has tasted the fruits can testify. They may also agree that the name of "dogberry" is well applied, if the prefix indicated worthless qualities. "Choke pear," a name for *Aronia arbutifolia,* is perhaps misapplied, but botanically the word pear is nearer the truth than is berry.

Those unfamiliar with matters botanical are often puzzled by the apearance of extensive colonies of a plant like the strawberry in appearance but which never bears the familiar fruits. Overlooking the fact that strawberry flowers are white they have, of course, mistaken the yellow-flowered species of *Potentilla* for the more desirable plant. Our commonest species, *Potentilla Canadansis*, is frequently known from this circumstance as "barren strawberry," but its more familiar and appropriate names are "cinquefoil" and "five finger." Both allude to the fact that the leaves consist of five leaflets. The name first mentioned is simply the French for five leaves. "Sink-field" is an appellation which could only have been made by one unfamiliar with the French. The name of "running buttercup" if of course misapplied, though somewhat justified from the appearance of the flowers whic are much like those of buttercups and are not distantly related to such plants. "Star flower" loses any special application from the fact that most Dicotyledon flowers are star-shaped, or at least possess five petals. *Potentilla Monspeliensis*, a weed of no particular beauty, shares the name of "barren strawberry" and is also known as "rough cinquefoil." *Potentilla argentea* is well known as "silvery cinquefoil," a name that the specific term emphasizes, though one may not discover where the "silvery" comes in until the plant is turned over. Viewed from above, the leaves are dark green. "Hoary cinquefoil" is less poetic name alluding to the silvery under surface of the leaves. An allied species, *P. anserina*, larger and coarser in appearance, is known as "silver weed" and "silver feather" from a similar whitened under surface of the leaves. The leaves are also somewhat more deeply cut than is common in the genus, in this respect resembling the "tansy"

(*Tanacetum vulgare*) and accounting for such names as "wild tansy," "dog's tansy," "goose-tansy" and "goose grass." I suspect that the presence of dog and goose in some of these combinations indicates a coarse or spurious quality rather than any connection of these animals with the plant. Our only shrubby species of *Potentilla* is *P. fruticosa* which inhabits hillside pastures and other dry open places. Besides its name of "prairie weed," of obvious derivation, it is known as "shrubby cinquefoil" and "hardhack," this latter name bestowed upon it, because it makes mowing with the scythe difficult.

Not so long ago, the "marsh cinquefoil," which now often goes by the name of *Comarum palustre,* was regarded by everybody as a true member of the *Potentilla* genus. It is still kept in the genus by Gray's Manual as *Potentilla palustris,* and several of its vernacular names allude to the relationship. Unlike the other members of its alliance, this species grows in bogs and has thus gained the name of "bog strawberry," I do not recall ever finding it in marshes, although its best known name "marsh five-finger" assumes this habitat. It is the only species with purple petals and it is naturally called "purple cinquefoil," "purple-wort" and "purple marsh-locks," though what "marsh-locks" are, I have never been able to fathom and the dictionaries I have consulted are silent on the subject. "Cowberry" seems equally unintelligible.

The strawberries (*Fragaria*) are universally known by the name we have here used and a near relative, *Duchesnia indica,* which closely resembles them in leaf and fruit, albeit the fruit is insipid and useless, is known as "mock strawberry" and "barren strawberry." "Indian strawberry" is a translation of the specific name and savors of the "English names" invented for various species that lack real vernacular names.

Of the word strawberry itself, there are various explanations. Some would write it "stray-berry" from its habit of straying into new grounds by means of its numerous runners. Others insist that the first part of the word "strawberry" alludes to the custom of strewing the floor with straw in which the leaves of our plant were mingled. Still others see in the strawlike runners, the origin of the name. My own preference is for "stray-berry." If we must accept the second explanation, could the name not have been given because the plant strews or carpets the ground as straw was used to cover floors?

Included in a paragraph devoted to the strawberry-like plants, might properly be the true "barren strawberry" (*Waldensteinia fragarioides*), whose specific name points to its resemblance to the strawberry. This plant bears yellow flowers, but is otherwise very strawberry-like in appearance. The plant is also known as "dry strawberry." In Eastern thickets there is a retiring and inconspicuous member of the roseworts, *Dalibarda repens*, that always reminds me of the strawberries, perhaps because like them, it is close to the earth and spreads by runners. The latter fact has not escaped the makers of common names as the appellation "Robin-runaway" attests. The plant is usually known as "false violet" since the leaves are roundish and somewhat suggestive of those of violets. Another name is "dewdrop" but neither this nor the others with which it has been distinguished seems at all appropriate.

In August, in many New England meadows, the true "hardhack" (*Spiraea tomentosa*) appears, lifting its spires of tiny rose-purple flowers above the surrounding vegetation. Earlier in the season it was in evidence for quite another reason, for its hard stems make it well known to the mower. Those who have seen the plant at its best will agree to the appropriateness of such names as "steeple bush." "rosy bush." and "meadow sweet," though they may be sure the last mentioned was not given by the haymaker, in fact, it more properly belongs to its larger relative, *Spiraea salicifolia.* "Whitecap" may have been applied to the plant in regions where the plants have less color, but "poor man's soap" is meaningless applied to this plant, which lacks saponaceous qualities. Undoubtedly the "Jersey tea" (*Ceanothus Americanus*) has been confused with it.

The word "meadow sweet," upon no less an authority than that of Dr. Prior, is said to have no connection with meadows, but to be derived from the fact that the plant so named was once used to mix with mead in the belief that it gave to this beverage "the flavor of the Greek wines." The plant is scentless, both as to flowers and foliage and its effect upon the mead must have been nil, though probably not noticed after a few sips of the liquid. It is likely most plant lovers will overlook its ignoble use and think of it as one of the sweets of the meadow, as its common name suggests. "Meadwort" and "mead-wort" are ancient names for the plant. Another familiar common name is "queen of the meadow" though in this it has to divide the honors with related species of *Filipendula.* It is difficult to say whether "spice hardhack" refers to the use of the plant in flavoring or whether spice is an attempt at pronouncing *Spiraea.* In Europe the meadow sweet is sometimes called "bride-wort" for the reason, it is said, that the trusses of flowers suggest the plumes anciently worn by brides.

Resembling the species of *Spiraea* so much as to be frequently classed with them is the "nine bark," *Physocarpus opulifolius*, or as some of the books have it, *Opulaster opulifolius.* Its bark has the habit of separating from the stem in numerous long, thin strips, from which circumstance its only common name is derived. The species of *Filipendula* are sufficiently like *Spiraeas* to share the common names of "meadow sweet," "bridewort," "meadwort" and "meadow queen." "Queen of the prairie" is another term to signify the preference of our plants for open places. The species is also known as "honey-sweet" and "sweet bay," the latter name, it might be said having nothing in common with the plant regarded as the true sweet bay. Still other Spiraea-like plants are those in the genus *Aruncus* which are commonly known as "goat's beards." Probably the name, which is a very old one, was suggested by the panicles of creamy-white flowers which the plants bear. It is embodied in the generic term *Aruncus* given to the plants by Pliny in the first century of our Era.

Though now and then various species of roseworts may so closely resemble the buttercups as to be confused with them, the resemblance is seldom close enough to puzzle the botanist himself, except in the case of the various species of *Geum*. One of the main differences between the two, it may be observed, is that in the roseworts the stamens are on the calyx while in the buttercups they are on the receptacle. None of the *Geums*, however, have names in the vernacular that suggest resemblances to the buttercups, possibly because their medicinal properties, fancied or real, have overshadowed other characteristics. The most important instance of this is *Geum rivale* which is known as "throatwort," "throat root" and "cureall." Aside from its medicinal virtues, this species has some standing as a beverage plant, a decoction of the root being reported to be a fair substitute for chocolate. In consequence, it has been known as "chocolate root" and "Indian chocolate." The best known name is "purple avens." The pendulous blossoms have also earned for the plant the name of "drooping avens" while "water avens" and "river avens" allude to its habit. "Evans root" is manifestly a variant of "avens root." *Geum strictum* is known as "yellow avens" for the color of its flowers, and this as well as the other species is called "herb Bennett." This latter name is said to be a contraction of *herba benedicta,* literally the "blessed herb." This name comes to us from Europe where an allied species was reputed to have magical properties. It was said that if a root of this plant is in the house it renders the devil powerless against it. The name of "black bur" given to our native species refers to the seed-head which somewhat like a small burdock, adheres to everything with which it comes in contact. The name of "camp root" may refer to its use in intestinal troubles such as are likely to develop in camp; but this is a mere surmise. *Geum Canadensis* is called "red root" for obvious reasons and it is also known as "herb Bennett." The original "herb Bennett" was the European *Geum urbanum* and this was truly the blessed herb since its leaves and flowers were once carved on many a pillar and facade of the early churches. *Geum ciliatum* is known as "prairie smoke" and "Johnny smokers," possibly because of its plumed achenes like wisps of smoke. The word "avens" applied to this genus is of obscure origin. It is reported to come from the French, but the meaning is at present a puzzle.

The genus *Dryas,* but sparingly represented in this country, is known as the "White Mountain avens" and "wild betony." The latter name has a rather curious history. According to Pliny it was originally *Vettonica* in honor of a Spanish people the Vetones. In Latin it became *Betonica*, in English speech "betony," and in country parlance "bitney."

Another rosaceous genus with medicinal qualities is *Gillenia* whose two species, *trifoliata* and *stipulacea* have several vernacular names indicative of the fact. The plants were sometimes used as an emetic in place of the true ipecac, hence "American ipecac," "false ipecac," "Indian physic", and "dropwort." "Bowman's root" evidently refers to some early practitioner who made use of the plant, but there seems to be no record of the fact except the name. Many books apply the name "Indian hippo" to this plant but the term is absolutely unintelligible to the writer.

Once as famous in medicine as the species of *Geum,* the common agrimony (*Agrimonia eupatoria*) has few if any names to suggest the connection, though "feverfew" is probably of this nature. The makers of vernacular names have been more impressed by the hooked fruits as "stickweed," "stickseed," "beggar ticks" and "cocklebur" attest. All these names, it may be observed, are applied to many other plants with hooked seeds or fruits and are scarcely distinctive. The plant usually goes by the name of "agrimony" or "rough agrimony."

The two species of *Alchemilla* credited to America are both adventive from Europe and have no American vernacular names, though plentifully supplied with trivial names from European sources. Of those for *A. pratensis*, the majority are given in allusion to the shape of the leaves, as "duck's foot," "bear's foot," and "pedelion" (that is, "lion's foot"). Probably the commonest of English names, "ladies' mantle," has only a fanciful application, while "great sanicle" alludes to its reputed medicinal qualities. The true sanicle which this species in a measure resembles derives its name from the Latin *sanare* meaning to heal. One of our species of *Sanguisorba* is known as "great burnet," apparently deriving its name from the same word as brunette is derived! *Sanguisorba minor* is the "salad burnet" from the use of its leaves in salads. The plant also goes by the name of "pimpernelle," "bloodwort" and "toper's plant" from the virtue attributed to it of being "a friend to the heart and liver." Since it was usually administered in "the cooling tankard," it was very likely a favorite with the toper, serving possibly the excuse that quinine does in other parts of the world.

CHRISTMAS ROSES

By Mary Earle Hardy

ON last Christmas day in Michigan, we dug away the snow and gathered an exquisite bunch of Christmas Roses. The flowers were nestled among the tough evergreen leaves of the plants and the drifted leavs of deciduous trees growing near by. They suggested the purity and sweet trustfulness of babyhood.

Our thermometer registered but a little above zero. As we brought the blossoms from under the blanket of snow, we dropped them into a pan of cold water, albeit we shivered a bit at giving the baby things such a bath, but some of the stems were stiff with frost, making the strenuous treatment a necessity. Kept in a cool room they retained their loveliness for two weeks. The dear little children of the snow love nothing better when brought indoors, than to snuggle their faces against the cool window pane and look out at the landscape. So much of suggestion to those who gather Christmas Roses from under the snow.

Although called by the name of the queen of flowers, they are not roses at all, but instead, belong to the widely related Buttercup family, and are scientifically named *Helleborus niger*. They come to us from over the sea, being little mountain climbers and loving best the rugged and wooded defiles of the southern Alps and Apennines. Their blossoms are waxy white, lightly touched here and there with the faintest flush of pink. Their petals are scarcely observed, except by those who carefully study the construction of the flower, being exceedingly small and strangely twerked into tiny two-lipped alabastrons holding the faintest of perfumes. What we call the petals, are the five waxen sepals which give the flower a breadth of two to five inches when spread. When not expanded, these assume the shape of a most exquisite little cup.

The stamens of the flowers are numerous, and their pistils form coriaceous capsules containing many seeds.. The seeds are hard to germinate and the plants slow of growth. The radical evergreen leaves of the plant are palmate or pedate and finely notched at the edges, and are of just the right dark hue to best bring the lovely waxen blossoms into relief.

The name *Helleborus niger* has reference to the black root of the plant; and with curious wonderment we wish we knew the why and how that so black a root bears so white a flower. After the flowers have passed their youthful grace and bridal beauty the waxen petal-like sepals, take on a shade of green, while their seeds slowly mature.

The purity of the Christmas Roses which open when other plants are dead and in their sealed tombs, gives these especial grace. And the impossible becoming possible at the season which we celebrate as the birth time of the Christ Child, has long associated them with the Nativity. There is a pretty legend of a little child who followed the shepherds to the stable, and lingering, beheld the infant Jesus when Magi offered their gifts. Exceeding love filled the shepherd child with desire to likewise bring an offering, and the sentient earth thrilled by the child feet sent up the white flowers to be his offering. Thus, the legend affirms, came the Christmas Roses to the world, the white flowers of the Nativity.

Ancient English annals tell of "blessing the houses and the herds with the black hellebore or Christmas Rose." A preliminary ceremony being to draw a circle around the plant with the point of a sword, the suppliant then offering prayer to Apollo and to Aesculapius the God of Medicine, that they be not offended at the digging of the root and bearing it away to a human dwelling.

Our Christmas Rose has a lovely cousin, known as the Lenten or Easter Flower. The leaves of this plant are not evergreen, nor tough and leathery, like those of the Christmas Rose, for they are not plants of the winter and it is not the Nativity that they celebrate. At Easter time, they break their dark tombs in the earth and come up to join the great Ressurrection Allelujah! The flowers of this variety are not snow white, like those of the Christmas Rose. Several are borne upon each pedicle and they are light green, the pale delicate shade of a katydid's wing.

THE RAREST AMERICAN PLANT

By Willard N. Clute.

A number of American plants are so rare that they occur at only a few scattered stations or, in some cases, at only one, but when there is only a single station known for a plant in the whole world and a lone individual represents the species even here, it is evident that its claim to being the rarest American plant cannot be easily refuted.

About the year 1878 Dr. E. J. Hill of Chicago, collecting along the Kankakee river in Eastern Illinois, found a species of globe mallow, near the city of Kankakee, which appeared to be unique. It has since been known as *Sphaeralcea acerifolia.* Later a species so closely resembling it as to be regarded as identical with it has been found to occupy a wedge-shaped area from Dakota to Nevada and British Columbia, but Dr.

Hill's find has always remained the only known occurrence east of the Mississippi.

In the 6th Edition of Gray's Manual, the station in Kankakee county, Illinois, is added to the range of the western plant, and Britton's Manual records practically the same distribution, but the 7th and latest edition of Gray reverses itself and on the authority of Greene and Fernald make the Kankakee plant a distinct species under the name of *Sphaeralcea remota* giving as its only station "a gravelly island in the Kankakee R., Ill." Fernald and Greene are well known to be acute botanists, and if their assumptions are correct, our plant at once becomes extremely rare.

Since the locality for the plant is not so far distant from my own residence, I have many times planned to visit the place and see the plant in its native haunts. Last year the attempt was made, but there are too many gravelly islands in the Kankakee to make it easy to locate the right one, and we came home empty-handed. There was plenty of the rose mallow and the halberd leaved mallow but no sign of *Sphaeralcea*. Some time later, mentioning the plant to Judge Arthur W. DeSelm of Kankakee who was familiar with its haunts, he very kindly gave more explicit directions for finding it, and in August 1920, in company with two botanical enthusiasts, a second search for the plant was made and this time crowned with success.

The discovery, however, was not achieved without considerable search. The gravelly island was located all right, but a pretty thorough exploration failed to bring to light a single plant. At last, fully convinced that it must be a rare plant, I was crossing a plowed area on the island, homeward bound, when there on the edge of the field, so near to the last furrow that some of its roots had been severed by the plow, stood a single plant of the rare mallow. There was no mistaking the pubescent maple-shaped leaves from which the plant took its original name.

In consideration of the fact that the plant stood in imminent danger of extinction by the plow, it seemed an act of piety rather than of vandalism to take it away to safer quarters, and it now is in my own grounds where it is growing vigorously. The flowers are rather small and of no great beauty, but the rarity of the plant gives it a certain charm that does not attach to commoner plants. We secured an abundance of seeds and hope by another year to have done something toward modifying its rarity.

If any western reader who has access to plants of *Sphaeralcea acerifolia* will be kind enough to send me seeds of it, I shall be glad to grow the two forms side by side and later report any difference that may be discovered between them.

UNDER WHICH CODE?

By J. C. Nelson

NOW that the whirlwind, the fire and the earthquake of Dr. Britton's recent philippic against the supporters of the International Code have passed away, and the few wretched survivors have timorously ventured forth to behold the ruin which has been wrought, the time for the still, small voice appears to have arrived. Dr. Britton's well-known preference of the club to the rapier as a weapon of offense makes us wonder if he did not long ago discover the profound wisdom of Sir Toby's exhortation: "And as thou drawest, swear horrible; for it comes to pass oft that a terrible oath, with a swaggering accent sharply twanged off, gives manhood more approbation than ever proof itself would have earned him." But in all seriousness, when we try to look at this vexing problem of nomenclatorial codes in that dry impersonal light which should distinguish a gathering of scientists from a political convention, the question that persists in obtruding itself upon our minds is this: Why is all this intemperate vituperation directed against those whose only offense is their inability to see any other way of arriving at a standard code than that of international agreement? For when the smoke has all cleared away, and we come down to what the editor of this magazine calls "brass tacks," what *is* the "*unum necessarium*" about a code? Since it deals not with the names of *things* existing in nature, as do the other terms of scientific glossology, but with mere inventions of the mind more or less arbitrarily adopted to facilitate an easy interchange of ideas, it cannot be subjected to the same rigid and exacting requirements. The fact that one code is more "logical" than another gives it no advantage, unless it happened to be adopted first. Esperanto has a marked logical superiority over English and French as a written language; but somehow we don't seem to see that these illogical but picturesque tongues are being crowded out as a consequence. Even the "reformed" spelling of the vernacular so frantically advocated by certain pedagogues gifted with everything but a sense of humor does not appear to be gaining ground with any very alarming rapidity. People still appear to find their way about in cities like Paris and London, even though the naming of the streets lacks the exact logic of Salt Lake City; and those reforming spirits of the French Revolution, who laid violent hands on almost everything connected with human life, from clothes to calendar, seem to have stopped short before devising a "logical" scheme for the use of parents in naming their children. All these aspects of nomenclature have this common element, that they have gained a priority based on common agreement, and have thereby acquired a sort of intellectual "right of easement." Only a pedant would dream of trying to displace them on the ground of their lack of logic, or make any other demand of them than that they be as nearly universal as possible. If each species has a name, and that name has been sanctioned by common agreement, it does not seriously matter how "logical" or beautiful or appropriate it is—we can do business with almost any kind of money provided it bears the stamp of a solvent government.

But in scientific matters it is hardly feasible to wait for the slow process of growth to establish a code; the element of artificiality will enter to this extent, that an agreement must be arrived at by common consent in a council of representative scientists. The Vienna Congress was a council of this sort; the fact that the majority of its members were Germans and Austrians was not the result of deliberate "packing," but was the natural outcome of the council being held in the territory of these nationalities. Would not the nation on whose door-step any such congress was held be able to "dominate" it in the same way? If it had been held in America, *we* would have been able to control the majority of votes, and our ideas would have prevailed; but would we have regarded this as a valid reason why the Germans should "bolt" the decrees of the congress? It has long been the accepted rule of parliamentary government that the decision of the majority shall prevail; if this majority happens by a geographical accident to belong to a single unpopular nationality, is that sufficient reason for a "bolt"? Dr. Britton has waxed eloquent over the mysterious horrors of "internationalism," overlooking the fact that we have recently had a rather convincing demonstration of the results of unrestricted nationalism; and yet his objection to the Vienna Code seems to be largely based on the fact that it was *not* international! The argument appears to take the following syllogistic form:

> Any code whose formation is dominated by scientists of one nationality is not valid;
>
> The Vienna Code was dominated by the Germans and Austrians;
>
> Therefore a code devised by a minority of Americans is valid!

The charge of "autocracy" laid against the Vienna Code—which might carry more weight if it emanated from some other source than the highly centralized administration that flourishes in Bronx Park—amounts to this: that whatever the other fellow controls is autocracy, but what *we* control is liberty. All the changes on this argument were rung by the Peerless Leader some years ago, when it was propised that these United States defy the world in the matter of a monetary standard; but a tolerably convincing verdict was rendered at the polls.

The point which is too often lost sight of is this: No matter what defects a code may have, the fact of its universal acceptance will outweigh them; conversely, no matter what are the excellencies of any local code, they are wholly overbalanced by the fact of its provinciality. When we are called upon to judge between the claims of two conflicting codes, the question is not at all which is the more "logical," but which was adopted by more general consent. Just as in taxonomy the fancied beauty or appropriateness of a name must yield to the law of priority, so in the matter of choosing between the codes the only valid argument must be based on general acceptance. If we throw out a code because its authors were Germans, we ought to throw out a very large number of generic and specific names for the same reason!

And who can demonstrate that the interests of taxonomic botany in this country have in any way been promoted by the attempt to substitute a code of our own devising? Instead of judging each new botanical manual on its own merits, and with that fine impartiality which should be the mark of the scientific spirit, we find that the book must stand or fall according to the code which it follows. We have seen a series of pretentious and expensive works follow each other from the press, each a duplication of the work of some contemporary author whose chief misfortune was to have used the other code; instead of a union of forces toward the solution of our urgent taxonomic problems, we have wasted our strength by keeping up this division into two more or less hostile camps; and all to what end? I~~f~~s the matter of nomenclature of such superlative importance in science that it must take precedence over every other consideration? Dos it matter nearly so much how "logical" a code is, or by what nationality it was devised, as that it was adopted by what was called together as a representative body of scientists? Even in Dr. Britton's severely "logical" American Code there are features that do not appeal powerfully to the mind which clings to logic in all things—the use of duplicate binomials for instance; but if the use of duplicate binomials had been decreed by a general congress, and sanctioned by a general acceptance, as is the case in zoology, the point would not be worth squabbling over, and we could all afford to subordinate our prejudices to a whole-hearted acceptance.

But when a code is in effect rammed down our throats by a self-appointed coterie who have never submitted their creation to the approval of the whole scientific world, who have persisted in trying to bolster it up by a lavish expenditure of sarcasm at the expense of those who have failed to conform, and have thereby lost sight of that fine and courteous impartiality that should characterize all scientific intercourse, it seems to be high time for us to return to first principles, and lose no occasion of clearing away the pretentious scaffolding of false reasoning that has been built up around a structure which demonstrably rests on an unsound and insecure basis. No advantages, fancied or real, that have accrued to the individual benefit of the adherents of the American Code, can outweigh the loss to the interests of botany in general. Taxonomy in America is steadily losing ground as a result of this unhappy division; and the number of systematists who are doing work of real excellence can almost be numbered on the fingers of two hands; while the ecologists and physiologists, unhampered by any serious difference in matters of mere opinion, are advancing the boundaries of their fields by leaps and bounds. Rathr than contribute further to this deplorable state of things, many of the weaker brethren are giving up their own inmost convictions and acquiescing more or less tamely in the incessant demand for conformity; and by thus adopting a false principle, they are indirectly helping to bring taxonomy into even greater disrepute.

It is unfortunate that the deliberations at Vienna could not have been attended by a larger number of American botanists; had we been in the majority, and had succeeded in bringing about the adoption of what ought to be called the "*Codex Noveboracensis*," the German brethren would have been compelled enther to accept it with such resignation as they could muster, or else be stamped forever aftr as "secessionists" and "soreheads." Perhaps the German predilection for submitting to constituted authority might have made it easier for them to yield than it has been for some of us. Even as it is, after the lavish expenditure of money and effort to build up a new sect of the botanical faith for the accommodation of the "bolters," there remains a very respectable remnant who persist in recognizing the principle of international agreement as the one valid rule to be followed in selecting a code. To these scientists it will never "go without saying," to use Dr. Britton's words, that they make a compromise with their scientific conscience, and abandon what they belive to be right; and they can see little difference between a code "forced down their throats by a German majority" and one handled in the same manner by an American minority. The crack of the whip will doubtless continue to sound in the ears of those who lack the courage to do their own thinking; but as long as there are men broad enough to disregard all appeals made in a spirit of narrow Prussianism, just so long may we expect to be occasionally interrupted by outbreaks of somewhat unscientific but wholly righteous protest. *In tabernacula tua, Israel!*

NEW ENGLAND IN AUTUMN

By Rev. Manley B. Townsend

AN October ramble through the beauty and glory of autumnal New England is an experience filled with rarest delight. The whole landscape is a riot of wonderful color, green and scarlet and crimson and gold. "Solomon in all his glory" was never so brilliantly arrayed. New England is the land of beauty. Mountain, forest, lake and stream, wild and rugged, as well as our pleasant valleys, fertile meadows and open fields combine to produce a landscape of rare lovliness and unique charm. And New England is never more lovely than:

"When woods begin to wear the crimson leaf
And suns grow meek and the meek suns grow brief
And the year smiles as it draws near its death."

One day in mid-October, as I sat at my desk looking out over the housetops toward the distant woods, I felt the strong stirring of that primeval instinct that grips one at times and lures him from the beaten path of conventional, life out into the open spaces and the primitive wild. It was a wonderful day—one of those rare, ephemeral days that come all to sudden and go all too soon. The call was irresistable. Dropping all things and donning old clothes, with field glasses and note-book, I "cut stick" and escaped the shackles of civilization. Soon I was out in the fields, then up over the hill and down by the river's edge.

On every side glowed thousands of burning bushes, oaks and sumachs and maples. Like Moses at Sinai, one felt like "taking his shoes from off his feet" for the place whereon he was standing was "holy ground." Clothed in cloth-of-gold were the poplar and birches. Many shrubs had on their crimson dresses—blackberry, raspberry, blueberry and dogwood. Touched with rich russet hues, the sweet ferns shed their exquisite perfume upon the air. Only the pines, hemlocks, and alders retained their garments of green. Most of the wildflowers were faded and gone, but the seeds were there ready for distribution. Some of them, like the asters and goldenrods, were beginning to spread their sails and float off on the wind; others, like the beggar ticks and trefoils, were "laying for" the unwary passer-by, their barbs all ready to "hook on" and catch a ride. Sprawled over the bushes were the fluffy filaments of the clematis and the woody stems of the bittersweet, the latter with their orange fruits.

Out from under a high bank gushed a little spring, crystal clear, and here a few belated flowers still bloomed. There was a great matted bed of forget-me-nots, a few purple asters and goldenrods and a spray or two of bedstraw. Above from a sandy bank, sprang a number of late blossoming harebells. Here the south sun lay warm and pleasant, delaying the nip of Jack Frost for a few days or perhaps weeks. Beyond the spring, the valley of the Nashua widens into a swamp and there great quantities of cranberries were growing. They were large and ripe and prime and it seemed a pity that they should lie there ungathered. Scattered among them were many clumps of the carnivorous pitcher plants, their curious pitchers filled with water and containing the remains of numerous luckless insects trapped by these wonderful devices. Two muskrat houses rose from a tiny pond in the swamp. All about through the marsh nodded the snowy plumes of the cotton grass.

To add ot the enjoyment of the afternoon, the migratory birds were all about, mostly silent except the crows and jays. The myrtle warblers were especially numerous, but most abundant of all were the juncos. They were everywhere their white tail beacons flashing out as they flew from place to place. There were white-throated sparrows also, slipping silently through on the migration, as well as blue birds, chickadees and song sparrows. Occasionally a ruffed grouse would burst upward on thunderous wings and go hurtling through the woods.

The afternoon was one of rare enjoyment and when home was reached, after a circle of perhaps, five miles, and the tramper sat before the open fire, living over again the events of the day, there descended upon him a feeling of supreme peace and content. Old Mother Nature had laid her hand in kindly benediction upon his head.

THE TOAD LILY

tricyrtis hirta

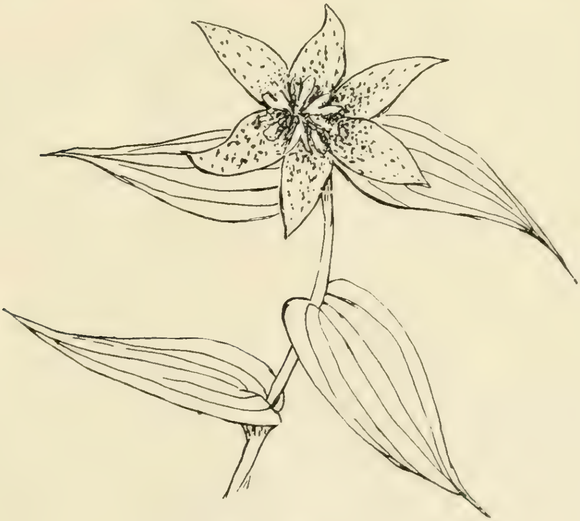
By Willard N. Clute

NEARLY all the monocotyledonous plants of the North Temperate zone bloom before midsummer. A few garden plants, to be sure, such as the gladiolus, the blackberry lily, and the day lilies prolong the blooming season well into August and the autumn crocus, the meadow saffron, and a few of the true lilies may open in September, but it is left for the curious toad lily to close the season in the flower garden while the delicate ladies' tresses represents the group afield.

The toad lily is truly the last of its kind. So late is its blooming period that the flowers are often frozen before they have had time to open. One might think that after a few experiences of this kind the plant would be able to change its habit somewhat, but no amount of coaxing seems to hurry it. It has always bloomed in late autumn and apparently it always will. With an entire season in which to prepare for the great event, it joins the witch hazel, and chrysanthemum in delaying the process of flowering until the very last minute.

If the autumn frosts hold off long enough, or if the plant is artificially protected, it at length puts forth a number of purple-spotted flowers that suggest those of its not too distant relative the blackberry lily. The flowers are of the conventional lily form but are much smaller than those of any common lily. The lateness of the flowering season and the unusual color-pattern of the flowers combine to make the plant of considerable interest. Unlike many other spotted flowers, the spots are not confined to the corolla, but are thickly spread over calyx, stamens, and even the styles and stigmas. The markings are heaviest on the perianth, growing larger and more numerous toward the throat of the flower where they end in a blotch of yellow. The pistil consists of the usual three carpels with the styles and ovaries united but the deeply forked stigmas spread out at right angles to the style, like the spokes of a wheel, above the six stamens.

Although so late in blooming the flowers appear to have no trouble in getting pollinated. That this is due to the good offices of some insect is manifest for the stigmas are usually well sprinkled with pollen grains before the stamens near by are open. Cross pollination therefore seems to be the rule.



The Toad Lily

There are some half dozen species of the genus to which our plant belongs. All are native to the Himalayas, China, or Japan. The leaves suggest those of the straw flowers (*Uvularia*) and it is not surprising to learn that the plants belong to the same division of the lilyworts. Like the other plants of its division the underground parts are rhizomes and not bulbs and as they branch rather freely, a single plant soon becomes a clump. Though not a conspicuous plant in the garden, it is still worth room for the cheerfulness with which it meets the chill days of autumn, lighting up the scene until the last mild day.

WINTER FLOWERS IN MASSACHUSETTS

By Mrs. Inez P. Mayhew

If one found the witch hazel or winter-bloom tree (*Hamamelis Virginiana*) in blossom from October fourth until the very last day of January and the skunk's cabbage (*Symplocarpus foetidus*) dusty with pollen on March fifteenth, big patches of snow being thickly scattered about, he would naturally ask "Can I find a wildflower for every winter month?"

Having myself made the foregoing observations, I have interestedly and patiently watched for as many wildflowers as could be found blooming in their natural haunts and making friends with the ice and snow. What a pleasant result; the year's circle does meet without omitting a single month.

These flowers are easily found in the dooryard in November: blue aster (*Novi-Belgii*,) charlock (*Raphanus raphanistrum*,) golden aster (*Chrysopsis falcata*), wild pepper-grass (*Lepidium Virginicum*), and common clover (*Trifolium pratense*.) On the seashore is found the handsome sweet-scented *Angelica purpurea*.

After a long tramp on December fifth, the reward came in a flower of the lavender sea rocket (*Cakile edentula*) found growing at the foot of a sheltered bank and upon reaching home an abundance of the little white chickweed (*Stellaria media*) was noticed in bloom right by my door. This tiny member of the Pink family was also in full bloom on Christmas Day, after there had been sleighing, and a number of these little stars wished me happy New Year on January first. The flowers were perfect in January, tiny, red anthers and all. When the winter-bloom's golden stamens had all blown away, I was delighted to see a quantity of the chickweed in bloom beneath a shrub on the lawn, so late or so early as February first.

What a dear little flower to bloom all the winter round in Massachusetts! Perhaps, it helped to supply with food the few song birds that were brave enough to live with us all winter, as Mrs. Dana says the seed of *Stellaria media* is food for song birds. Had I observed this flower in November I should say it must bloom every month in the year. So does one get from this so called insignificant weed more real bravery than is found in its more showy friends, the goldenrods.

ANOTHER POISONOUS PLANT.—A species of milkweed from our Southwest very similar in appearance to the whorled milkweed (*Asclepias verticilata*) of the Eastern States is reported to be poisonous to cattle, horses and sheep. The new species or form is called *Asclepias galioides.* It is said to be distasteful to live stock, but when animals are confined in pastures where other food is scarce, they may eat it and thus become poisoned. The plant grows so thriftily in some regions that it is very difficult to eradicate it. Most cultivators are familiar with the tenacity with which nearly all milkweeds hold to a locality when once they are established. The existence of the poisonous species in cultivated grounds and pastures, however, is a constant menace and no effort should be spared in an attempt to eradicate it.

NOTE *and* COMMENT

Insect Powder.—The people of the United States now use about two million pounds of insect powder annually. All this is made from the unopened flower-heads of one of our familiar garden plants, the pink daisy (*Pyrethrum roseum*) which is also known as *Chrysanthemum coccineus* and other species of the same genus. The Persian insect powder is made principally from *P. roseum*, but the Dalmatian powder or buhach is made from *Pyrethrum* or *Chrysanthemum, cinerariaefolium*. A third species sometimes used in *Pyrethrum carneum*. The fact that a powder made from these flowers would destroy insects has been known for a long time, but its use in America began only about fifty years ago. The bulk of the powder is still produced abroad, but California is now adding to the supply. Since the plant grows readily in most parts of the United States it would be possible to produce our own supplies. The manufacture of the powder is very simple. The flower heads are collected, dried, and then ground to the yellowish powder with which most people are by necessity familiar. Buhach, the name by which the powder is often known is from a Slavonic word, *buha*, meaning a flea.

Corn and the Rainfall.—The yield of corn in Ohio is very largely dependent upon the amount of rain in June, July and August. When the July rainfall is less than three inches, the average yield is 30 bushels per acre, when it is five inches or more the yield is 38 bushels; which means that these two inches of rain have added 27,300,000 bushels to the corn crop of this State, worth at 1919 prices about $35,000,000. When the July rainfall is three and a quarter inches, the yield is 15,000,000 bushels greater than when it falls short of this amount by half an inch. Each quarter of an inch increase between the totals of two and four inches means an added value of about $7,800,000. Taking the four great corn-growing States of Indiana, Illinois, Iowa and Missouri, the addition of half an inch to a total of two and three quarters inches adds ten bushels per acre to the crop yield on an average. This thin layer of water is worth at present prices about $13 an acre, or a total for these four States of the Corn Belt of the significant sum of $4,000,000,000. Truly if corn is king in this region, water is the power behind the throne.—*From an article by Thomas A. Blair in Scientific Monthly.*

THE ANCIENT BACTERIA.—Bacteria are at once the simplest and the oldest of living things on our planet. Not so long ago, it was taught that the bacteria are degenrated relations of the green or blue-green algae, but the investigators of the earth's crust find evidences of bacteria in the earliest strata that contain organic remains and now regard them as the original "old settlers." Finds of this nature seem to have pushed back the date of the origin of plants and animals for millions of years. The earliest bacteria appear to have obtained their energy by oxidizing substances other than those containing carbon. The sulphur and iron bacteria, which are undoubtedly responsible for some of our iron deposits are among the number. Some such forms have probably given rise to the higher species of plants that get their energy through photosynthesis. If we may judge from the evidence of the rocks, the early bacteria were not disease producing. Bacterial diseases have originated as evolution has progressed. The first animals and plants evidently were not confined to any definite length of life, but lived on in placid enjoyment of their environment until some change in the earth itself terminated their existence. Disease and death due to it, appear to be mere modern adaptations.

WATER CRESS NATIVE.—Rev J. M. Bates writes that in his opinion the water cress (*Nasturtium offcinale*) is in no need of Americanization. He found it filling the streams in obscure counties of Nebraska thirty years ago and says that "Unless we have the careful reports of botanists of the time of Lewis and Clark we cannot prove or disprove any such contention." Additional evidence that the plant may be native came to light last summer when the writer of this paragraph found the plant choking up the rills from springs in the Tuba Oasis in Northern Arizona. With the exception of two or three Hopi pueblos there is no town of any kind in any direction for nearly a hundred miles and practically no water at all since the entire region is a desert of great aridity. How the plants were transported to such an out-of-the-way spot is something of a mystery. They may have been carried thither by the Mormons who used to roam the region, but it is not likely, or at least the chances are as good for its being a native.

NEW FORM OF CRAB.—While housewives in Eastern America are making jelly and preserves of the hard, sour, but fragrant fruits of the wild crab, their sisters in the Mississippi valley often find the same occupation less tiresome because they can secure the larger fruits of another species. This latter plant is known as the Iowa crab (*Pyrus Ioensis*). There seems to be two forms of the wild crab in the East. From Ontario south to the Ohio valley or beyond is found a species known as *Pyrus* (*malus*) *glaucescens*. In the Gulf States is another species, *Pyrus*, or *Malus*, *coronaria* which overlaps the range of the first species on the north. The large fruited species is found in the Mississippi valley but may spread eastward into the range of the other two. Wherever it grows, however, it may be readily distinguished by the size of its fruits. Some in the Editor's garden have fruits seven inches in circumference, but otherwise are like the common wild crabs. The trees from which these fruits come do not conform in all respects to the specifications. The leaves are not pubescent at maturity, even on the veins, as they should be, the flowers are not decidedly fragrant and they are not so highly colored as those of *P. gluaccscens* with which they grow. It is possible that our trees are hybrids, but until this in certain it may be best to call the form *Pyrus* (*malus*) *Ioensis* var. *glabra*. Seedlings from these trees occasionally have slightly pubescent leaves.

Levulose Syrup.—Levulose is perhaps better known as fruit sugar. It is found in honey, many fruits and can be produced by splitting cane sugar into two simpler sugars. The interesting thing about levulose is that it is reported to be from 30 to 50 per cent sweeter than cane sugar. It does not readily crystallize like cane sugar, but may be used in the from of syrup for sweetening all sorts of foods and beverages. While both glucose and levulose are found in a variety of plants, the commercial source of glucose is corn starch which is artificially digested to corn syrup. Levulose is most economically made from inulin a substance allied to starch that is found in artichokes, dahlias, oyster plant, and numerous other composites. According to a writer in *Science*, an acre of ground will yield about 2000 pounds of starch, 1600 pounds of sorghum sugar, 3000 pounds of beet sugar, from 3000 to 4500 pounds of cane sugar, or nearly 4000 pounds of levulose. And levulose is the sweetest of the lot. The only thing that stands in the way of forever putting an end to sugar famines is a scheme for economically extracting the inulin and turning it to levulose.

This latter is not likely to be long in appearing since the chemistry of the subject is not difficult.

COTTON AND THE WEATHER.—In the great Cotton Exchange in New York and in the primary cotton markets of the South, the price of cotton has always fluctuated, from day to day during the growing season with the daily reports of the weather conditions in the Cotton Belt where the world's supply of this staple is largely produced. But it has fluctuated erratically and without any solid knowledge of the exact amount of influence the weather may have upon the yield. Recently, however, a well-known American economist and statistician has shown that he can predict the total yield with remarkable accuracy by mathematical analysis from a knowledge of the average weather conditions from May to August, an accuracy greater than that of the estimates based on the condition figures of the Government crop reports. The favorable weather conditions differ somewhat in the different sections of the Corn Belt extending from Texas to South Carolina, but the most important requirements are that May shall be dry, June both warm and dry, and August cool and wet, a cool and wet August being of the most importance. Sitting in his New York office, without ever having seen a cotton plant growing and without receiving any reports as to the progress of the crop, the master of the newer statistics can at the end of August insert these weather values in his formula and tell how much cotton will be ginned in the South during the following autumn and winter.—*Thomas A. Blair in Scientific Monthly*

MEANING OF PENNYROYAL.—Your derivation of pennyroyal seems perfectly sound. It might add to the interest to know that *Pulegium* is derived from the Latin word for "flea." *Pulegium regale*, the name given to the plant by the early herbalists, would thus mean "royal fleabane." We need not necessarily infer that royalty was more in need of this remedy than the commoners, but rather that the plant was of more than ordinary efficacy against the elusive pest. Judging from the virtues of oil of pennyroyal when used to keep off mosquitoes, the royal part may not have been an exaggeration.—*James C. Nelson.*

VITALITY OF GRAY POLOYPODY.—The little gray polypody (*Polypodium incanum*), whose habitat includes much of the warmer part of the Western Hemisphere, is known in the Southern States as the "resurrection fern" from its habit of curling up during periods of drouth and reviving when moisture is more abundant. In most of its range it grows on the trunks and branches of trees, where it is deprived of moisture for long periods and thus some such arrangement is necessary to preserve it from extinction. Miss E. F. Andrews, who has been experimenting with this plant with reference to its ablilty to go without water, reports in *Torreya* that specimens removed from its haunts and brought indoors remained in a basement without water for seven months and spent another seven months on the top of a bookcase in a study and yet were able to revive when exposed to the rain. The fern is aided in its resistance to drouth by an close covering of scales most abundant on the under side of the leaves. In dry regions a number of ferns adopt the polypody's method of escaping drouth. The writer of this paragraph recalls being directed to a certain rock ledge in Jamaica for a rare fern and finding upon examination that a period of dry weather had dried the vegetation into an unrecognizable mass. Collecting a supply of the haylike debris, however, it was deposited in one of the tin bath-tubs, with which English colonists are so fond of ornamenting their sleeping rooms and when morning came, there in the tub was as fine a lot of specimens as one would wish to see.

EDITORIAL

Any annual subscriber, at present on the lists of this magazine, who pays for two years in advance and aks to be transferred to the "Permanent List" will be credited for *three* years and at the end of that time will be billed for future volumes at $1.00 each. This is a great opportunity to get the magazine for a dollar a year forever and all who expect to continue interested in plant life for more than two years should take advantage of it. Of course we shall be glad to receive single subscriptions at the regular annual rate of $1.50, but we feel that those who have been supporting the magazine are entitled to a reduction. No order will be accepted which does not add "Send me the magazine until I order it discontinued. I will pay for it each year when most convenient." This does not pledge the subscriber to take the magazine longer than the time for which he has already paid; it simply ensures us that we will be notified when he wishes his subscription stopped and enables us to count him among the permanent supporters of this publication.

* * *

According to Shakespeare, "We are advertised by our loving friends," but we are of the opinion that the aforesaid loving friends may overdo the matter on occasion. Take W. S. Harwood's "New Creations in Plant Life" for instance. This volume, which has achieved the distinction of a second enlarged and revised edition, purports to describe the work of Luther Burbank in plant breeding, but the scientist, grounded in plant physiology and ecology, is not entirely convinced that many of things stated therein as facts do not fall into another category. He is sure, for instance, that "four-fifths" of the plant's food is not "nitrogen gas taken from the air." He is inclined to doubt that Burbank bred a walnut with shell so thin that the birds ate it and so he had to breed a thicker shell on it. One wonders whether the cherries, plums, and peaches in that remarkable part of the world are also enclosed in shells. Some of the nuts produced had so much tannin as to be "absolutely dangerous." Probably a persimmon in Burbank's garden would be regarded as a calamity. Many other equally astonishing "facts" are recorded, but if the "Wizard" can take a single "poppy seed capsule, divide it into four sections and, by pollinating each section, produce from one section an annual plant, from another a perennial, from the third quarter crimson poppies and from the fourth white ones," he is indeed worthy of his title. The feat of taking a dozen rabbits from the silk hat of any person in the audience is quite tame by comparison. Still other things are mentioned about which even the common or garden variety of scientist knows something and this knowledge enables him to realize what delightful fairy stories may be found on half-facts. The author claims the white blackberry to be an exclusive Burbank "creation," but those who live out nearer the tall timber are inclined to think that the original white blackberry grew in Adam's garden. Sixty-five thousand bushes were destroyed in making Burbank's plant. Referring to the fact that Burbank bred a red flowered form of the California poppy, the author adds: "Many acts has this man done which savor of the miraculous, but none more marvellous than this." This should be encouraging to the numerous breeders who have produced red flowers in other species. According to our author, it is the easiest thing in the world to make a blue rose and yet with a big prospective demand for such a flower the Wizard refuses to gratify us. He is reported to have crossed both the apple and the mountain ash with the blackberry and "strangely enough, the blackberry seeds which came from the cross produced the apple tree growth." We certainly echo that "strangely enough." Burbank is said to have "disproved the Mendelian laws" overthrown the Mutation Theory and settled the whole question of the inheritance of acquired characteristics. "What occupation" he is quoted as saying, "can be more delightful than adopting the most promising individual from among a race of vile, neglected, orphan weeds with settled hoodlum tendencies, down-trodden and despised by all, and gradually lifting it by breeding and education to a higher sphere; to see it gradually change its sprawling habits, its coarse ill-smelling foliage and its insignificant blossoms of dull color, to an upright plant with handsome glossy, fragrant leaves, blossoms of every hue and with fragrance as pure and lasting as could be desired;" at which we sigh "Ah! what indeed!" There seems to be no disposition among scientists to belittle Burbank's work. He is a man of rare ability and has achieved many remarkable successes in plant breeding, but this is no warrant for his deification by those unfamiliar with plant life nor an excuse for the careless handling of facts by entertaining writers. The harm that much of the so-called "popular" literature has done to science can scarcely be estimated. Nearly everything that the general public knows about plants is not so, because it has obtained its "knowledge" from just such fairy stories. The book under discussion has many fine illustrations that show clearly some of the improvements made in plants, and mingled with the nonsense is a large number of important facts, but readers are cautioned to look out for pitfalls. The book is published by Charles Scribner's Sons, New York.

BOOKS AND WRITERS

"Heredity and Evolution in Plants" by C. Stuart Gager, is a re-issue of several chapters from the author's earlier volume "Fundamentals of Botany" together with additional new chapters on the distribution of plants, the whole making an attractive presentation of the subjects included in the title. Although the simpler plants are frequently mentioned, the discussion really begins with the structure and evolution of the fernworts and the higher plants receive the greater share of attention. The chief concern of the book is the methods by which plants have come to have their present forms. The problems of heredity are explained and much space, of course is given to the Darwinian and Mutation Theories, the experimental study of heredity and evolution, and the distribution of plants in time and space. The latter phase of the subject is of especial interest, though frequently omitted from similar books. The clearness of the text is one of its chief recommendations. There are a number of unique and modern illustrations and the book as a whole can be recommended to anyone desirous of a concise explanation of plant evolution. It is published by P. Blakiston's Son & Co., Philadelphia.

Although the entire annimal world subsists upon plants, poisonous species seem to be the rule rather than the exception. Even some of our food and beverage plants contain poisons as for instance chocolate and coffee. Usually, however, the poisons are present in such minute quantities that they are really harmless; indeed, several of the plants most frequently used owe their chief value to these substances. A number of common plants are well known to be poisonous and are shunned accordingly, but many others, seldom regarded as noxious may be included in the list. Among these are the corn cockle, marsh marigold, black locust, wild cherry, buttercup, lily-of-the-valley, may-apple, celandine, and black nightshade. Certain other plants may cause death to stock, infect cattle with milk-sickness, or excite hay fever in man. The poisonous principles are commonly glucosides or alkaloids and some species contain more than one substance of this kind. In some, also, the poisonous principle does not develope until the plants have wilted or have been bruised. The American poisonous plants of every description are discussed by Dr. John W. Harshberger in a new book entitled "Text-book of Pastoral and Agricultural Botany," published by P. Blakiston's Son & Co., Philadelphia. In this the poisonous plants hold first place followed by an account of the principal forage crops, nitrification, weeds and their control, and seed testing. Several pages are also devoted to a list of edible plants, with notes. The book is a valuable accumulation of facts, but the lact of careful organization is evident in many places. We recognize the importance of the data presented, but still desire the opinion of the author regarding them. Very few errors of statements are found in the book, though in the case of the marsh marigold and black nightshade, they are given reputations for harmfulness which the reviewer believes quite undeserved; at least, if they are poisonous he does not understand how it happens that he is still on earth. As a whole the book is a valuable contribution to that slowly increasing section of literature dealing with the economic aspects of plants, and will no doubt be widely used. It is intended mainly for use in high schools and colleges and contains directions for laboratory work as well as an extensive vocabulary.

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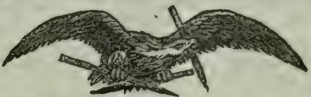

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EDITED BY WILLARD N. CLUTE

Volume XXVII

JOLIET, ILL.
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CONTENTS

Arizona, Two New Species from, . . *Dr. P. A. Rydberg* 61
Botanizing in the Painted Desert, ... *Willard N. Clute* * 1
Cuscuta cuspidata, A Curious Abnormality in,
. . . . *Dr. T. G. Yunker* *48
Classification, Fossil Plants and, . . *Prof. H. S. Conard* *95
Contributions of the Plant Breeder to the Garden
. . . . *Lucile Marshall* 8
Earth Stars, ... *Mrs. Mary Earle Hardy* 86
Flowers, Wayside, ... *Adella Prescott* 124
Midsummer Flora of Tuba Oasis . . *Willard N. Clute* *41 101
Old Garden Flowers—The Columbines,
. . . . *Willard N. Clute* *121
Owners of Complete Sets 63, 142, 153
Oregon Plants, Notes on, ... *R. W. Bradshaw* 126
Plant Names, Additional Notes on 141
Plant Names and their Meanings, ... *Willard N. Clute*
    Liliaceae 18, 50, 88
    Leguminosae 129
Plant Names, Rocky Mountain, ... *Mrs. M. E. Soth* 140
Roses, A Reminiscence of, ... *S. B. Parish* 60
San Gabriels, An Excursion in the, ... *Geo. L. Moxley* 134
Sassafras, The, ... *Mrs. Viola E. Richards* *105
Tuba Oasis, Midsummer Flora of, . . *Willard N. Clute* *41, 101
Water Lily, The Victoria, ... *Willard N. Clute* * 81
Wayside Flowers, ... *Adella Prescott* 124
Willows, Oregon . . . . *R. V. Bradshaw* 56
EDITORIAL 36, 74, 114, 154
BOOKS AND WRITERS 37, 76, 115, 156

NOTE AND COMMENT

Ant Gardens....................107
Ant, The Industrious..........151
Blackberries, Gigantic..........108
Botanist, The Amateur........ 64
Brachysm in Maize............ 68
California Plant, Rare......... 27
Chestnuts, Resistant........... 25
Climates, United States........ 24
Common Names from Surnames 110, 145
Common Names of Eucalyptus. 26
Day Lily, Tawny.............. 65
Dentaria, A New Form of...... 69
Dodders, The Curious..........108
Dogbane Insect Traps......... 29
Dogwood, A Freak............113
Edible Flowers................ 31
Edible Lilies.................. 27
Environment, Adaptation to.... 66
Eucalyptus, Common Names of 26
Fern Spores, Much Travelled... 28
Fern Spores, Starting..........146
Ferns, Valuable................144
Flora, The Ancient............ 34
Flowers, Edible................ 31
Forma, versus Variety.........109
Fruits of the Flowering Quince 145
Gardens, Ant..................107
Gentian, Prairie................147
Goat Weed in Idaho.......... 70
Hawthorns, Consider the 29
Hawthorn vs. Thornapple 32, 72, 147
Honey Locust, Plant Hairs of..149
Insect Traps, Dogbane........ 29
Iris, Yellow, Naturalized.......112
Lilies, Edible.................. 27
Lima Beans, Poisonous........ 72
Long Time without Winding...148
Maidenhair Tree...............150
Maize, Brachysm in............ 68
Mary-Buds, Winkling..........152
Monocarpy 196
New Form of Dentaria, A...... 67
Nomenclature, Absurdities in... 33
Nomenclature, Multiple........ 67
Peloria in Violets.............. 71
Pest versus Pest...............107
Plants, Surnames from.....72, 148
Poison Ivy.....................111
Quince, Fruits of the Flowering 145
Redbud, Cauliflory in.......... 73
Redroot and the Pigs......... 28
Rhubarb Leaves Poisonous.... 69
Ripeing, Slow................. 23
Sensitive Stigmas.............. 25
Species, Decadent.............. 31
Surnames, Common Names from 110, 145
Surnames from Plants......72, 148
Thornapple, Hawthorn vs. 32, 72, 147
Tribulus becomes a Tribulation 149
Tundra, The Arctic........... 71
Variety, Forma versus.........109
Variety of Varieties, A........ 30
Violets, Peloria in............ 71
Wanted and For Sale..........113
Weather Predictions, Long Range 151
Wild Plants, Educating........ 65
Witch Hazel, goes West....... 66

Vol. 27. No. 1 Whole Number 128

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FEBRUARY, 1921

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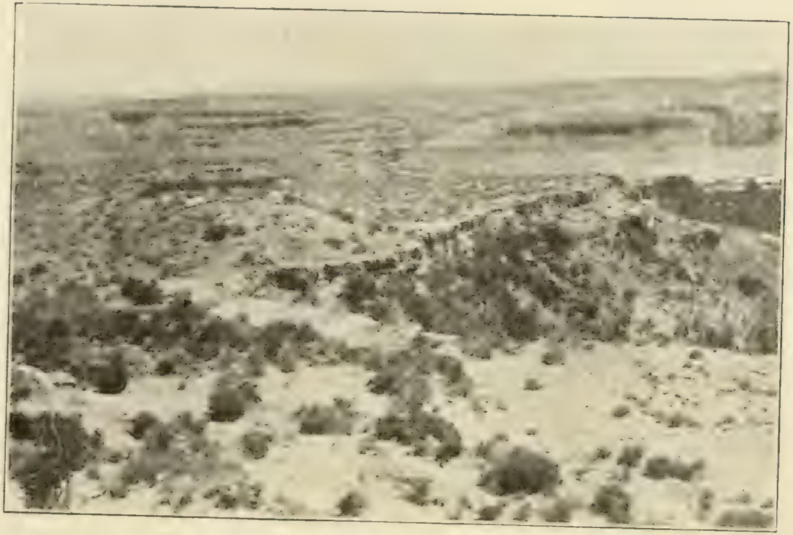

Painted Desert, Looking Toward Moenkopi Wash.

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When first the lone butterfly flits on the Wing,
When red glow the maples, so fresh and so pleasing,
O then comes the bluebird, the herald of spring,
And hails with his warblings the charms of the season.
—Alexander Wilson

BOTANIZING IN THE PAINTED DESERT

By WILLARD N. CLUTE.

ARIZONA, the sixth largest State in the Union, consists almost entirely of desert lands. Of its more than 72,000,000 acres, only about one tenth is cultivated. The name Arizona, appropriately enough, is often assumed to have reference to the "arid zone" in which the State is situated, but this derivation is incorrect. The name really comes from an Indian word "Arizonaca" said to mean a place of small springs. This, however, is only another way of putting it. The springs are certainly small and exceedingly far apart.

The southern part of the State has many good examples of the true cactus desert, but in the northern part the scanty vegetation is of quite a different type being characterized by numerous small-leaved shrubs and herbs with only a scattering of cacti. It is this latter type of desert that prevails in the broad valley occupied by the Little Colorado and its tributaries in the northern tier of counties which, owning to the multicolored cliffs and canyons that are here in evidence, has come to be known as the Painted Desert.

Nearly a hundred miles northeast of Flagstaff, in the midst of this waterless expanse of drifting sands, stony plains, and lava outcrops, lies the oasis of Tuba. It is the one verdant spot in the wilderness and its flora, quite unlike that of

MAR 9 1921

the surrounding region, is one of considerable interest. In the early summer of 1919, we camped at Tuba for a few days on our way to the great Natural Bridge over beyond Navajo Mountain and observed some of the interesting features of the flora. When the opportunity to make a closer acquaintance with it was offered in 1920, I quickly took advantage of it and spent about a month in the region during which time practically a complete collection of the plants was made. Kayenta, some seventy-five miles northeast of Tuba, was again visited by way of Red Lake and a trip was also made to the cliff dwellings in Laguna Canyon, all of which resulted in adding additional specimens to my list.

One could scarcely imagine a more remote and isolated situation for human habitations than Tuba. Accessible to civilization by a single indifferent road, connected with the few and distant trading posts by mere trails, and surrounded by a scattered population of Hopi and Navajo Indians, it presents a phase of existence which, if somewhat retired, is not without its attractions. Mocking birds sing in the spiry poplars that line the single street, doves coo in the orchards of apple, pear, peach and apricot, humming-birds glide from flower to flower, and the splash and gurgle of water in the irrigation ditches is an ever-pleasant sound. Fed by the cool clear water that here comes to the surface in a number of springs, the vegetation possesses a luxuriance quite in contrast to that of the adjacent region. Only a few feet beyond the influence of the water, the hot, dull-red sands, thinly scattered with greasewood, rabbit-brush yucca and joint fir, stretch away to the horizon in grim and lifeless silence. But on the hottest days, when the temperature of the desert may run well above a hundred, one can always find coolness in the shade of the poplars.

The occurrence of this water in the midst of the desert was doubtless known to the aborigines from the earliest times. Probably the region was inhabited by the cliff dwellers or their contemporaries and these were followed later, by the Hopi Indians, and still later by the Navajos. Nearly four hundred years ago, the first Spanish explorers found the Hopi here and he still clings to the locality with ways very little changed through his contact with the Whites. The Hopi are pueblo indians and their village, Moenkopi, is located on a slope overlooking a Wash by the same name, about three miles from Tuba. The Navajo is more a lover of solitude and his hut of mud and brush, scarcely superior in finish to that of the muskrat, is found here and there in the driest and most desolate spots.

The first white settlers entered the region about 1878. They were Mormons, and with their usual industry they began planting orchards and shade trees, constructing irrigating ditches and reservoirs and establishing a successful agriculture. Twenty-five years later their holdings were taken over by the United States Government and the place has since been the center of the Western Navajo Indian Agency. Evidences of Mormon occupation about many moist places no longer cultivated are still to be seen and the irrigating system now in use follows in general, the lines laid down by them. Tuba City, so called, to distinguish it from a town of similar name in the southern part of the State, consists of about a dozen houses of adobe and stone, clustering about the hospital, school and administration buildings of the Agency.

Less than a hundred acres are cultivated in the oasis proper, but a much larger acreage is cropped in the Moenkopi Wash a few miles further south, and the area is apparently capable of still greater extension. There is always running water in the Wash, the chief supply coming, as in the oasis, from numerous springs and seeps. A large part of this runs down from Reservoir Canyon a few miles to the east traversing on the was a cat-tail swamp. At one point a low dam forms a small lake, in the swampy borders of which the wild ducks nest. Much of this water is used by the Hopi in his irrigation projects and the rest renders fertile the government farm further west. Much of the flood waters from the Black Mesa, fifty miles or more northeast, also runs off through the Wash. Owing to the rocky surface of the country, very little of the rainfall is retained and some hours or days after a storm on the distant heights, a dark and turbid torrent, more like liquid mud than water, pours through the valley, often tearing out dams, silting up reservoirs and irrigating ditches, cutting new channels, and causing much other damage.

The highest recorded temperature at Tuba is 108° F. in August and the lowest 13°F. in December. Much of the year, therefore, is favorable to plant growth, but the lack of water reduces the vegetation to the minimum. As in all the surrounding region, there is a marked difference between the day and night temperatures. Owing to the dry air, cooling after sundown is very rapid and the air may become decidedly chilly before morning, even in summer.

The precipitation in the Oasis is insufficient for dry farming. It is seldom more than six inches a year and a great deal of this falls as snow during the resting season. Under irrigation, however, the soil yields good crops of corn, wheat, cotton, alfalfa, melons and all the common garden crops. The precipitation, moreover, is distinctly seasonal. From the last of March to the middle of July—the season of greatest bloom elsewhere—little, if any, rain falls. In 1920 there was no precipitation whatever in April, May and June. This uneven rainfall has an important effect on the vegetation. Upon the breaking up of winter, there is sufficient moisture for flowering and most of the desert plants burst into bloom. Then en-sues the dry period during which the plants sink into a sort of æstivation and the vegetated areas assume a characteristic gray-green hue. In late July the rains begin again and a second spring soon sets in with a profusion of flowers scarcely second to that of the earlier season. A number of plants bloom only once, but others bloom twice a year and at the time of my visit were found with both flowers and mature fruits.

A collector in the desert, especially if it be as remote from civilization as this one, cannot fail to have a variety of interesting experiences. He soon discovers, for one thing, that although the air is very dry it does not follow that the drying of plants will be an easy matter. Water plants, to be sure, are ready to remove from the driers at the end of twenty-four hours, but the true desert plants have profited by their long experience with a scanty rainfall and hold on to their moisture with a baffling persistence. It required nearly a month to induce some to even approach dessication.

In this region the character of the plant population depends in large measure on the character of the soil. In general, sandy or adobe soils tend to have a more luxuriant flora than do stony areas. For much of the distance between Flagstaff and Tuba, especially in the vicinity of the Little Colorado river, the region is absolutely bare of vegetation. When plant growth of any kind is possible, an eriogonum (*E. divaricatum*) and two saltbushes (*Atriplex saccharia* and *A. Jonesii*) are scattered over the hot soil. The eriogonum appears to be the very last thing to give up the struggle with heat and drouth. One of the surprises of this section is to find a yellow-flowered milkweed, (*Asclepias obtusa*) growing singly in situations where the temperature must daily reach 150° F. or more.

In less inhospitable situations, the ordinary inhabitants of the desert push in, but seldom in numbers large enough to entirely cover the soil. Even the most fertile spots have a tufted appearance, owing to the tendency of all the plants to take on hemispherical forms. In all but the driest locations the greasewood (*Sarcobatus vermiculatus*) is the dominant shrub, its fat cylindrical leaves strung along the branches suggesting the fronds of ferns. Other conspicuous shrubs are the big rabbit-brush (*Chrysothamnus graveolens*) and various species of shadscale (*Atriplex*). Interspersed with these usually grows the low rabbit-brush (*Chrysothamnus filifolius*); in fact, the round, yellow-green clumps of this plant are so abundant over thousands of square miles hereabouts as to become exceedingly tiresome to the eye. Scarcely less abundant is the rayless goldenrod (*Isocoma heterophylla*) which forms similar, though larger, hemispheres of green.

With the exception of several species of Opuntia, cacti are rare. A narrow-leaved yucca is abundant and also the joint fir or Mormon tea (*Ephedra viridis*). Here and there the dry and shifting surface of the sand dunes were splashed with vivid green where the Russian thistle (*Salsola pestifer*) has established itself. The plant is reported to have entered the region about 1890 but it now has all the appearances of a native. It produces immense rounded clumps, often four feet or more across. Sheep and goats eat the young plants with avidity and even the yuccas and joint firs do not entirely escape.

Trees of any kind are, of course, rare in the desert, but as one climbs to elevations of a mile or more above sea-level, the one-seeded juniper (*Juniperus monosperma*) and the pinon pine (*Pinus monophylla*), begin to appear and with them the sage-brush (*Artemisis tridentata*). This latter plant, so abundant in many localities, is almost entirely absent from the vicinity of Tuba.

One does not study the vegetation long before discovering that three floras meet in this region. There is first the flora of the desert proper, which extends for hundreds of miles in every direction, then there is the hydrophytic flora about the springs, seeps, and reservoirs, and last and most interesting, the flora of the cultivated lands in the oasis. The wet grounds often of very limited extent, are the only places in the desert that appear reasonably full of plants. Here, one might imagine, competition of one species with another is possible; elsewhere, the struggle is not that of plant with plant, but rather that of the plant with the hard conditions of climate and soil. It is well known that the water plants are very much alike the world over and this region is no exception to the rule. It is difficult to say which particular species is most abundant, but the most conspicuous is most certainly the common cat-tail (*Typha latifolia*) which might be said to occur wherever there is moisture. The great bullrush (*Scirpus occidentalis*) is nearly always found with the cat-tail and the two often grow to a height seldom equalled elsewhere. Along the water-courses, the reed-grass (*Phragmites arundinacea*) forms thickets while the marshy places are well occupied by an umbellifer, *Berula erecta,* and various species of *Juncus.* I did not see a carex of any kind in my explorations. The common water-cress, however, fairly chokes up the small water-courses.

Neither the desert nor the wet grounds are lacking in flowers, but they possess few species that can compare in conspicuousness with the globe mallows (*Sphaeralcea*), the painted cup (*Castilleja linariaefolia*), desert trumpet flower (*Datura meteloides*), the evening primrose (*Oenothera sp?*), crownbeard (*Ximenesia encelioides*), the desert thistle (*Cirsium calcarea*) and many others. Along a small irrigation ditch that runs through the orchard at Tuba, I found one of the showiest of the milkweeds, *Asclepias speciosa,* with large pink blossoms like 5-pointed stars and near by, a large yellow evening primrose that may be new to science.

A complete list of the plants collected, with notes on their interesting features will be printed at another time. I cannot close this narrative, however, without some acknowledgement of the many kindnesses from those with whom I came in contact and which added much to the pleasure of my trip. I am especially indebted to Mr. Julius Buckbee of Kayenta, Mr. W. S. Beard of Flagstaff, Mr. Keirn, teacher at Moenkopi, and Messrs. Cook and Curley, Indian traders at Tuba, for aid and information. Last, but by no means least, my thanks are due to Supt. Robert Burris and his capable assistants at the Western Navajo Indian Agency. I shall long remember the evening gatherings at which much was done to entertain the stranger within their gates.

CONTRIBUTIONS OF THE PLANT BREEDER TO THE VEGETABLE GARDEN

By Lucile Marshall, M. A.

"INCREASE production of foodstuffs," is the great cry which is heard by farmers everywhere. It has been said there are three foundations on which rest the increased productiveness of crops and animals: the enrichment of the land; the tillage and care; and the producing of better varieties and strains. It is high time that growers give their full attention to the third of these. The experiment stations are leading the way by conducting experiments which deal with the fundamental problems of the locality. The results are helpful and constructive. Too often growers do not realize the practicability of the deductions with reference to their own problems. This seems true in the case of vegetable gardeners. So much has been done for the improvement of field crops that the improvement of vegetable seeds has been almost lost sight of. A surprising number of books and pamphlets on vegetable gardening do not even mention the subject of plant breeding in connection with vegetable growing in even a general way.

Technically, "seed-breeding may be considered from at least two very distinct viewpoints; first, the origination and development of new improved varieties, either through selection or cross-breeding; and second, the development and raising of truer, purer stocks or strains of proved value." This second branch of seed-breeding is of permanent and economic interest in our present emergency of scarcity of food-stuffs throughout the world. Associations have been formed in a number of states to encourage the farmer to demand better seeds, and the seedsmen to produce them. Notable examples of such work are the associations of Wisconsin (*Wisconsin Agricultural Improvement Association, and the Wisconsin Potato Growers Association*); Minnesota, (*Minnesota Field Crop Breeders Association*), Ohio; New York; Illinois, (*The Illinois Seed-Corn Breeders Association.*) Let us consider in detail what the plant and seed breeders have done for the improvement of vegetable seeds, and in this way discover other practical means of increasing production, taking the kinds of vegetables discussed by Professor Watts in his book on Vegetable Gardening in alphabetical order.

"The artichoke has been so little worked that it offers good opportunities for the amateur, either through cross-breeding or merely through selection. Plants grown from the seed are sure to show a certain range of variation, and you may readily develop improved varieties by selecting seeds from the best and repeating selection through two or three successive generations." Such is the opinion of Luther Burbank. By selective breeding after crossing several varieties of the European artichoke (*Cynara Scolymus*) he has developed the flower heads so that they are more than twenty-four inches in circumference when open. The artichoke is one of our few perennial vegetables, so gardeners can propagate from suckers and production can be increased by individual plants if the grower finds it desirable.

In asparagus we have a perennial vegetable which does not produce its best seed until after it is four years old. Professor Watts outlined a simple plan of selecting the most prolific plants, then the best berries on these plants, and also how to float off light inferior seed in the water test. Select one-year plants that look like smooth needles and bear in mind that male plants are more prolific than female. Experiments at the Ohio Station show a gain of the male over the female plants of 76% for the first period of cutting. The New Jersey Experiment Station has just issued a bulletin on "Asparagus Culture in New Jersey." It would be well for any grower to use varieties recommended in this bulletin if he does not wish to start his own plantation.

George Perry writes in the January 1919 Market Growers Journal, "There has been a great improvement in beans during the last fifty years. Still, the seedsmen list and sell, (*because they are called for,*) the sorts that were the best to be had fifty years ago. At that time the Long Yellow was the only string bean known, and, though tough and stringy, it is yet found in every catalog in the land. With the advent of the Stringless Green Pod, that variety in turn took the lead. In the shell beans there has been no such advance, as the Horticultural still holds the leading place. Bailey & Gilbert say, "Perhaps there are no plants more tractable in the hands of the plant-breeder than the garden beans." They tell of two seedsmen who wanted certain kinds of new beans and went to plant breeders to get them, just as one would order a piece of furniture made to order. Beans are prolific in yield so the problem is only to increase consumption by producing more palatable and attractive varieties. "Henderson and Kumerle Dwarf Limas were introduced in 1889, Burpee in 1890, and Barteldes in 1892 or 1893....and Burpee Bush Lima was presented to the public in the spring of 1890." Henry Schnell of Missouri grew a Tree Bean which he describes as growing "2½ feet high, and was really a small tree. It was very productive and matured early."

Bean-breeders have discovered a number of things that may be helpful to men who grow their own seed. For example, beans with fleshy pods succeed best on rich clay soils. The kidney wax on rich black soil. Soil and climate modify the character as to size and smoothness of leaves and fleshiness of pods. The breeders find that better seed beans are grown by light seeding. The plants are sensitive to excessive moisture or drought. Lima and pole beans seed well, grown along the California coast.

By the method of Vilmorin it is well known that plant-breeders have increased the sugar content of beets by continual selection. Also, varieties have been developed which mature in two months, instead of five. This makes increased production possible in the number of crops per season. Tracey points out that purer strains of stock of proved value should be raised. By a trial planting it was found that "practically every root grown from 2-rod plantings of each of 214 samples of seed purchased under distinct varietal names from the most reputable seedsmen of America and Europe could be grouped into not over twenty distinct forms, and the roots so thrown together show as little variation as the crop from any one of the twenty most uniform samples in the trial. Often the only difference between two lots sold under different names would be in the proportion of the roots of each lot that conformed to the same varietal form."

Of the Cole Crops, Cabbage is of the greatest economic importance. Breeders have produced different shaped heads —round or ball, egg-shaped, oval, flat and conical. The modification of the cabbage leaf has given us kale, collard and borecale. The modification of the stem has produced kohlrabi and Brussels sprouts. Variation in the flower and consequent careful selection produced the cauliflower. All of these originated from the wild *Brassica oleracea.* Plant-breeders at Wisconsin Experiment Station have developed the Wisconsin Hollander strain which is practically immune to Cabbage yellows. Southern-grown "frost-proof" has been proven of little value. At the Ninth Annual Meeting of the New York State Vegetable Growers Association, Mr. E. N. Reed told of a fine strain of Danish Ballhead Cabbage which has given 20 tons to the acre for the last ten years. Chinese Cabbage or Celery Cabbage is becoming more popular and it is a good heavy cabbage, weighing from three to five pounds. H. S. Lee of Kane County, Illinois, says he can get 98 heads out of 100 plants set out.

Herbert Starkey, President of the Pennsylvania Vegetable Growers Association, raised carrots from home-saved Danver's seed. The yields were from 500 to 700 bushels per acre. In New York, Oxheart has proved a heavy yielder—2 pounds per foot of row. Varieties have been discovered by breeders which are resistent to the Carrot rust fly (*Psila rosae*).

Self-blanching celery is directly the result of breeding and selection. It did not appear until 1884. It has revolutionized commercial celery culture. Interesting varieties have developed with which the grower should acquaint himself, choosing the seed best adapted to his need. In this way production can be increased with a minimum amount of effort

Chard or Swiss chard has been worked with and the varieties successful for blanching have been developed. Canners in Oregon are experimenting with a chard from which 4½ to 5 pounds can be picked at a time from one plant. Strains of chickory have been bred by means of selection which make greater production necessary to fill all the possibilities. There is Witloof Chicory or French Endive for blanching or salad purposes. There is the Large Coffee-Rooted and then the Gregory, etc., for "greens."

American breeders of cucumber seed have done much to increase the yield of cucumbers. For this purpose English and American types have been crossed, giving a type combining the good points of both. The variety Abundance is an example of this cross-pollination. Under glass and with intensive cultivation one can produce 36 dozen cucumbers to 100 square feet. In the west this is increased to 46 dozen to 100 square feet.

Burbank and others have experimented with the common dandelion and, by selection, the American Improved, Large, and the Thick-leaved French varieties have been bred. These varieties are much more palatable than the wild and may be blanched to increase their good qualities. Bailey worked with eggplant unsuccessfully. Self-pollinated seeds gave variable offspring and none reproduced the parent. Eggplants present a complex breeding problem because there is surface color and flesh color both to consider. The Department of Vegetable Gardening at Cornell was successful in grafting tomato scion on eggplant stock in 1915, but nothing extraordinary happened. The tomato bore its fruit serenely and the eggplant flowered but bore no fruit. The tomato plants were stolen when immature.

Endive is a native of East India. It endures summer heat well. Four commercial varieties are offered by Burpee. Growers should raise more of this as a late summer lettuce substitute. Expert growers like Peter Henderson have increased the yield of horse-radish from two to five tons per acre. The production of lettuce is increased by commercial growers who aim to have each plant as heavy as possible. Plant-breeders used two varieties for crossing—Grand Rapids and Golden Queen. A new loose type was developed for the west and a new head type was secured, better fitted for eastern conditions. The length of time needed from planting to maturity has been decreased. Now a spring crop will mature in seven to eight weeks, and a fall crop in twelve to fourteen. An acre planted in the best seed should produce 30,000 heads. The heavy producing Grand Rapids was produced by selection on the Black Seeded Simpson.

Productiveness in muskmelons depends largely on properly selected seed. The Indiana Experiment Station suggests the ideal type for breeders of the Netted Gem. Professor Watts says that the best fruit does not necessarily produce the best seed, but the entire plant with its product must be considered the unit.

The yield of the onion varies from 300 to 1000 bushels per acre. Selected seed is bound to increase the yield. Breeders have found it best to select bulbs for seed at harvest. According to Professor Watts "they should be of the desired size and form. A short neck is considered an advantage. Uniformity in all of the essential characteristics is exceedingly important in choosing bulbs for seed purposes. Seed bulbs should be stored and planted as nearly as possible in the spring." There are many varieties of onions and this makes possible an adaptation of the variety to soil and climate, which will of course increase crop production.

The Royal Horticultural Society's Journal for 1909 describes thirty-seven varieties of parsley. This shows that seed breeding might be better developed in the United States. The English have cultivated parsley since the reign of Edward VI. Consumption is increased by production of attractive varieties, and production is increased by varieties suitable to different environments.

Peas are more liable to cross than beans. Peas to be used for seed should be grown in an isolated spot. Uniformity in habit of growth is important. Mendel showed by hybridizing peas that there is a numerical ratio in given characteristics of cross-bred offspring. This law has been invaluable in all breeding work ever since. Mendel's law shows further that hereditary characteristics are usually independent units which segregate out upon crossing, regardless of temporary dominance.

Of Peppers, Professor Watts says: "Seeds should be selected with the greatest care. Some successful growers produce their own seeds and maintain superior strains. To prevent the development of the pungent character in sweet peppers there must be no cross-polination with hot-fruited varieties."

Varieties of radish show a wide range and those adapted for special purposes should be selected. Carriere produced radishes from the wild slender-rooted charlock (*Raphanus Raphanistrum.)* In forcing radishes great improvements have been made. Burpee has a variety called Rapid Red which will mature in 18 days under glass. Ten to twelve radishes can be raised per foot. The grower counts on getting four crops from October tenth to April fifteenth. Fourteen bunches—six to eight to a bunch—can be calculated upon from one square foot.

In the case of rhubarb seed only 15 to 20% of the seeds come true to name. Root cuttings or division of the clumps are more reliable methods of propagation. Interesting bud variations are always possible with perennial vegetables. In forcing rhubarb the petiole is longer, the texture is improved, the epidermis is thinner, and the water content is increased.

In English catalogs three varieties of sage are offered—green and purple, which are hardy, and a variagated form which is not. Dreer offers Holt's Mammoth Sage, but this does not produce seed and must be propagated by cuttings. Thorburn lists a Broad-leaf Sage, Red Sage and Purple Sage. Boddington lists three varieties—Common, Red, and Purple. It behooves growers to watch progressive seedsmen in their attempts to produce new varieties which are adapted to different climates. A plant in harmony with its environment will naturally make the best and quickest growth.

The Rhode Island Experiment Station in Bulletin 41 has divided the varieties of Spinach into four groups, each with characteristics clearly defined, so that growers may benefit by the distinctions, and plant to get the greatest yield possible for his given conditions.

Both the Maine and Maryland Experiment Stations have done considerable work on sweet corn, and their bulletins describe different varieties and their particular value. It has been found that cross pollination may take place at a distance of two miles. Black-birds carry pollen in their plumage. Varietal difference in time of maturity does not prevent cross pollination of corn. However, there is loss of vegetative vigor in plants which are persistently self-pollinated. Better stock seed corn should be used. Locally grown seed of good reputation is best to use in that locality. In the west the corn develops faster. Rich, mucky soil gives better field corn, while the gravelly soils give better returns in quality of sweet corn. Climatic conditions govern size of stalk and earliness. Soil conditions govern sweetness and tenderness.

The experiment stations have not been able to show that it is profitable to use large tubers of sweet potato for seed. A great deal of work has been done on sweet potatoes by experiment stations in both the North and South. Plant dealers know that some varieties have very much greater power to reproduce than others, and they charge accordingly for tubers which are to be used as seed.

New varieties of tomato are being discovered each year. Yields vary from 100 to 800 bushels per acre in the field. Great advances have been made in raising tomatoes under glass. It has been found that the English varieties are best for winter use and the American type for large spring fruits. The Engilsh variety Comet, which is small and adapted to dark weather, will produce 5 to 6 pounds per plant. The Peerless—an American variety—will produce 11 to 12 pounds of fruit per vine.

Plant Breeders have done a great deal to increase the production of field crops but there is eight times as much profit in vegetable growing as there is in general farming, according to census reports. Therefore it behooves the growers to make the breeders work for them, to help increase production. The greenhouse crops show the results of intensive study by breeders, and a like improvement is possible with all the vegetables. It is of great economic importance to make use of every bit of information gained by scientists which will help increase production. The grower himself will gain, and the world demands this efficiency in production which will increase the supply of food-stuffs.

PLANT NAMES AND THEIR MEANINGS--V

LILIACEAE—I

By Willard N. Clute.

IN nearly every large plant family may be found one or more lesser groups in which the species possess a certain likeness of their own and resemble one another more closely than they do the members of the family as a whole. Conservative botanists usually regard these as seperate sections of a single family, but others, less hampered by precedent, make distinct families of each group. Since such segregation does not affect the nomenclature of genus and species, it is perhaps, less objectionable than certain other practices of the systematist. There is no hard and fast line for separating plant families, and the matter may well be one of individual preference. In the case of the Liliaceae or lilyworts, however, if we were to follow the example of the more radical we would split off from it the Convallariaceae or Lily-of-the-Valley Family, the Smilaceae or Smilax Family, the Trilliaceae or Trillium Family, and the Melanthaceae or Bunch-flower Family. Of these groups the Trilliums and Smilaxes are usually retained in the Liliaceae but there is more reason for separating the others, and in any event, they all belong to the Liliales.

The typical forms that all botanists regard as belonging to the Liliaceae, are, of course, the lilies of the genus *Lilium*. The generic name is the Latin form of the Greek *Lirion* meaning a lily and is said to come from the "Celtic" *li* meaning white. It may perhaps be doubted if the "Celtic" has anything to do with the name and the suggestion may be merely another white li. The Name of *Erythronium,* given to another group of plants much like true lilies, is also from the Greek. *Erythros* means "red," and the name is said to have originally been applied to some species with flowers of this color. Still another lily-like group is found in the genus *Hemerocallis* which comes from two Greek words meaning "beautiful for a day," in reference to the evanescent character of the flowers. *Funkia,* the name by which other day lilies are called, is for Henry Funk, a German cryptogamic botanist.

The checkered perianths of some species of *Fritellaria* have suggested the generic name from *fritellus* signifying a chess-board. *Camassia* is an adaptation from the Indian camass or *quamash* by which name the aborigines knew the plant we call wild hyancinth. The name is often written *Quamassia.* The species are closely related to an Old World group to which the squills belongs and in early books may be found in the genus *Scilla.* *Yucca* is another aboriginal name, this time coming from Haiti. It is said to have been the original West Indian name for the cassava plant (*Manihot*) and to have been applied erroneously to our plant by Gerarde of "Herbal" fame. The genus *Tulipa* is said to come from the Persian *Thouliban,* signifying a turban, in allusion to the flowers. It is difficult to see how the suggestion applies, however.

Aletris, the generic name of a curious little plant known as colic-root, was apparently the name of a Greek female slave who ground corn, or rather, wheat, since the Greeks did not have the plant we call corn. Wood's "Class-book of Botany," however, says the name signifies a miller's wife, which perhaps amounts to the same thing! Whatever the derivation, the fact is plain that the name was applied to our plant because of the mealy appearance of the blossoms.

The Latins called the garlic *Allium* and by that name this plant and all its pungent relations have continued to be called. An onion-like genus of the South is known as *Nothoscodium* from two words meaning false onion. The generic name of the star-of-Bethlehem is *Ornithogalum* and the application of this has always been a puzzle, for it signifies bird's milk. One translator hazards the guess that is refers to the milk-white flowers like the white of an egg, but this seems an explanation made for the occasion with no basis in fact. The grape hyacinths, natives of Europe but naturalized in some places on this side, are found in the genus *Muscari* named for the musk-like odor of some species. The true hyacinths belong to the genus *Hyacinthus* which probably commemorates that Hyacinthus of Grecian fable who was accidentally killed by Apollo and from whose blood the first hyacinths are reputed to have sprung. The description of the original hyacinths, however, does not appear to fit our plants. One of the flowers often associated with the hyacinth is the Asphodel of the genus *Asphodelus* which, in the Greek, means unsurpassed, and is said to allude to the beauty of the flowers. This may have been true of the first flowers to bear the generic name, but in the shifting of terms so common in botany, the name is now anchored to plants which hardly come up to the specifications.

The plants usually placed in the Lily-of-the-Valley Family are less lily-like in appearance than those previously mentioned, but the family name, Convallariaceae, according to Gray, was derived from a lily—*Lilium convallarium.* Wood says, however, that the name is derived from the Latin *Convallaris,* "a valley," where some species grow. The name of the so-called wild lily-of-the-Valley, *Maianthemum* or *Majanthemum,* is formed from the Greek Maia, one of Pleides, and the word *anthos,* meaning flower. It is truly translated "May-flower." The genus is sometimes known as *Unifolium* meaning "single leaf," though the plant really has two, as the specific name *bifolium* indicates! *Asparagus* is the term by which the Mediterranean people knew our familiar garden plant and the name has come down to us through the ages unchanged.

In the Greek, *Polygonatum,* by which the true Solomon's seals are known, signifies "many knees" and alludes to the knobbed root-stocks. Some botanists call the genus *Salmonea* in honor of Solomon! The false Solomon's seals are placed in the genus *Smilicina,* supposed to be a diminutive of *Smilax.* As to *Smilax,* itself, the name seems of obscure derivation. It is an ancient Greek term and Gray suggests that it may have originally been applied to some other genus. Wood, however, derives the name from a Greek word for a grater and says it refers to the rough stems. A former Governor of New York and patron of science, DeWitt Clinton is commemorated in *Clintonia.*

The paired seeds in the fruits of *Disporum* account for the scientific name which means "two seeds" or "double seeds." A closely allied genus *Streptopus* is named from two Greek words meaning "twisted" and "foot." The English name is commonly rendered "twisted stalk," but "slew-foot" is possibly a more literal if less euphonious translation. When the trilliums are not separated as a distinct family, they are usually grouped with the Convallariaceae. *Trillium,* as is well known, comes from the Latin for three and alludes to the parts of the flower which are rather more conspicuously in threes than in most of the group. The reputed medicinal properties of the single species in the genus *Medeola* caused it to be named for the famous sorceress, Medea. According to fable Medea was familiar with a large number of potent plants which she used in working her spells, but the plants, the medicinal virtues of *Medeola,* and even Medea herself are now known to be mere creatures of the imagination.

The members of the group often known as Melanthaceae are least like lilies of any of the plants usually included in the Liliaceae. The name of the group comes from one of its genera, *Melanthium* from the Greek *melas* "black" and *anthos* "flower." Since the flowers are yellowish, it is difficult to say what Gronovius had in mind when he made the name. It is sometimes suggested that the flowers turn darker after blooming and thus account for the appellation. Another genus, *Veratrum* has a significance nearly synonymous with *Melanthium.* This name is from the Latin *vera,* "true," and *atrium,* "black" but it has no more reference to the color of the flower than has the first, for the flowers in this genus are greenish. The name is said to have belonged originally to the true hellebore (*Helleborus*) and may once have had some other significance. Other genera in this group have the Greek word for flower combined with some modifier in their names, as *Stenanthium* meaning "slender flower" in reference to the slender perianth segments, and *Amianthium* meaning "unspotted," either because of the glandless perianth or the pure white flowers. *Amianthium* is sometimes called *Chrospermum* which means colored seeds.

The pendulous flowers of *Uvularia,* appear to have suggested to Linnaeus the "soft palate" in man, hence the name from *uvula* a palate. Another name by which the genus was once known is *Prosartes* meaning "to suspend." An early New England botanist, William Oakes, is remembered in the *Oakesia* by which a section of *Uvularia* is sometimes known. *Tofieldia* in a similar way honors an obscure botanist of the 18th century who, Gray and Britton say was an Englishman but Wood more explicit, reports to be a Scotchman "residing near Doncaster."

The curious little "devil's-bit" has the name of *Chamaelirion* which is literally "low lily" in the Greek. It seems that

Wildenow, who named the genus, founded it upon an imperfectly developed specimen. *Helonias* is from the Greek for swamp in allusion to the places where some species of this genus grow. *Xerophyllum* is from the same language and means "dry leaf." The name *Narthecium* is said to be an anagram of *Anthericum* from the Greek *Antherikos,* a word said to have been the original name of the asphodel. The genus is also known as *Abama,* signifying "without step," being reputed to cause lameness in cattle.

SLOW RIPENING.—There are all sorts of variations in the length of time different plants require to ripen their seeds. This ranges from a few weeks in some of the early flowers to those deliberate species that ripen their fruits just ahead of the autumn frosts, to say nothing of such examples as are presented by some of the oaks, which take two years to finish the job. Among oddities in this line must be mentioned the maidenhair fern tree (*Ginkgo biloba*) which to all appearances ripens its fruit in autumn, though the union of the contents of ovule and pollen have not taken place. The fruit falls to the earth and lies there while sperm and egg unite and a new embryo develops. Several species of conifers are known which retain their ripe seeds in the cones for ten years or more, but the credit for the greatest deliberation undoubtedly goes to that species of palm known as the double cocoanut or Seychelles Islands palm (*Lodoicea seychellarum*) which is reported to require nearly a dozen years to mature its fruit. The seeds of this palm are probably the largest in the world and often reach a weight of thirty pounds. There is some reason, therefore, for the length of time it takes to ripen.

NOTE *and* COMMENT

United States Climates.—In a country as extensive as our own, there is room for a variety of climates. Meteorologists have investigated and mapped each with considerable accuracy. The largest is the Eastern Climatic Province which extends from the Atlantic ocean to the edge of the Great Plains and whose western margin corresponds roughly to the 20-inch annual rainfall line. Over this region the climate is remarkable uniform. Its seasons are strongly contrasted, the summers being hot and the winters cold. The rainfall is abundant and usually well distributed. On the south this region merges into the Gulf Province with higher temperatures, both winter and summer, and with greater annual rainfall. The changes in the weather here are fewer, less abrupt, and less distinct, owing to the fact that the region is rather beyond the belt of cyclonic storms. The Plains Province lies between the Eastern Province and the Rocky Mountains. It is a region of lessened and variable rainfall in which cultivated crops are uncertain without artificial watering, though dry farming is extensively practiced. Most of the rainfall occurs during the growing season. In temperature the region is much like the Eastern Province. The Plateau Province is the region west of the Plains Province. It has a still smaller rainfall and much of the region is arid, especially in the lowlands. Most of the North American deserts are in this province. In the northern part the greatest precipitation is in late winter and early spring; in the southern part the maximum rainfall occurs in late summer and in winter. The western coastal belt is the Pacific Province. The southern part has a climate like that of Mediterranean countries; the northern, like that of of Scandinavia. There are relatively small seasonal changes either in the cool and humid north, or the dry and warm south. The point concerning all this that is of interest to botanists, is that each Province has a fairly distinct flora of its own. Soil, elevation, and other minor factors may influence the relative abundance and local distribution of a species, but it is climate as a whole that controls the range of the majority and makes distinct floras recognizable.

Resistent Chestnuts.—The chestnut blight, discovered in New York City in 1904, has since swept away practically all the chestnut trees from an area extending from New York and New Jersey to Centrol Pennsylvania and Northern Virginia and is still spreading. Chestnut forests of commercial importance occur in seventeen States but there appears to be no way by which the disease can be controlled and the nineteen billion feet of this timber still standing seems to be doomed. Whether the chestnut tree is likely to become extinct or not is another matter. According to E. R. Hodson in the *Journal of Forestry,* there are signs that trees in the infected regions are developing an immunity to the disease and that these immune plants may revive and produce a race of resistant trees. Chestnut wood and bark have a number of important uses and the possibility that the mountains in the Alleghany region where the disease has wrought the greatest injury may be reforested with resistant trees is one likely to give foresters much encouragement.

Sensitive Stigmas.—A number of plants are known which have sensitive stigmas with lobes that close when touched. This feature has usually been considered a device for retaining the pollen when brushed from a visiting insect, but F. C. Newcombe recently reported that the closing of the stigma lobes is for the purpose of keeping the pollen grains moist and thus promoting their subsequent germination. In practically all cases where the stigmas are sensitive, they are not enclosed by the corolla tube and are thus exposed to the drying effects of the sun and wind. On sunny days the stigmas of some species close whether stimulated by the presence of pollen or not. The failure of some plants, such as Catalpa, to set an abundance of fruit is thus attributed to the drying out of the pollen on the stigmas. This, however, is certainly not the case with all flowers, for the lilies have strongly projecting stamens and pistils and yet have no difficulty in producing seed-pods.

COMMON NAMES OF EUCALYPTUS.—Australia is famous for its many species of *Eucalyptus*. More than 150 kinds are known. When planted in America they are usually known as gums, but the Australians have many other names for them and often divide the group as a whole into sections known as bloodwoods, mahoganies, boxes, tallow-woods, stringy-barks, woolly-butts, gums, peppermints, ashes, and ironwoods. Among the names for single species are spearwood (*E. doratoxylon*), Karri (*E. diversicolor*), jarrah (*E. marginata*), kino (*E. resinifera*), tooart-tree (*E. gomphocephala*) yate-tree (*E. cornuta*), and cider-gum (*E. Gunnii*).

HARDWOODS AND SOFTWOODS.—The woodworker has found it convenient to divide the various species with which he works into the two groups of hardwoods and softwoods. There is no hard and fast line for separating the two groups, but it happens that the softwood group very nearly corresponds to what are known to the botanist as Gymnosperms, that is, the pines, cedars, spruces and the like, while the hardwoods are mostly derived from the Angiosperms or true flowering plants. There are many exceptions to this rule, however. In our own country the basswood, whitewood, cottonwood and cucumber-tree, to mention only a few, have wood softer than that of many of the pines, while in the Tropics many Angiosperm woods are found that are softer than ordinary Gymnosperm wood, in fact the softest and lightest wood in the world is found in this group. Among Troopical Angiosperms with extremely soft wood are species of *Ochroma, Erythrina* and *Eriodendron.* It is suggested that the wood of Gymnosperms hereafter be called coniferous wood, as being more exact than the old term of softwood.

RARE CALIFORNIA PLANT.—In a new seed catalogue issued by Luther Burbank we read this astonishing statement: "The *Escholtzia Californica* is almost always called California poppy; it is not a true poppy. The *real* California poppy is an exceedingly rare plant growing in only two places in the world and is not even mentioned in cyclopedias and botanies." California, to be sure, covers a large area and doubtless has many rare species, but it seems little short of negligence for her botanists to allow such a rare species to go undescribed until attention is called to it in a seed catalogue. Seeds are offered at 20 cents a packet and if they delay much longer some Eastern botanist might invest twenty cents and beat them to it. Incidentally one wonders why a catalogue purporting to be issued by Luther Burbank should print such nonsense.

EDIBLE LILIES.—The lily family contains a number of edible species, ranging from the familiar onion, leek, and garlic to the more aristocratic asparagus, but none of these are true lilies in the sense that they belong to the genus *Lilium.* They are merely lilyworts. According to Harshberger's "Pastoral Botany," however, the Chinese eat the bulbs of the tiger lily (*Lilium tigrinum*) which they call "Chia-peh-ho." The flowers of another species (*L. Sargentae*) are also said to be eaten in China after being boiled, dried in the sun, minced, and fried with salt and oil. The mixture does not sound appetizing and most folks would scorn to treat any lily in such a manner. The flowers of the familiar yellow day lily or lemon lily (*Hemerocallis flava*) which, in spite of the lily part of its name, is not a true lily, are also said to be eaten by the Chinese.

MUCH TRAVELLED FERN SPORES.—In a recent number of *Ecology*, Douglas H. Campbell suggests, among other reasons for assuming a land connection between the Hawaiian Islands and other land areas in the Southern Pacific, that some Hawaiian ferns are common to the two regions adding: "It is difficult to conceive any means of transport from distant New Zealand or the mountains of Java and New Guinea to the mountain forests of Hawaii which would enable the spores of these delicate plants to survive the exposure of such a journey." The distance is four or five thousand miles, but we are disposed to think this no unusual journey for fern spores. The writer of this paragraph put on record in the *Fern Bulletin* for 1911, a much more marvellous occurrence in the same line. *Asplenium alternans* whose haunts are in the Himalayas and Abyssinia was found in Arizona by James H. Ferriss, quite ten thousand miles away from any other known locality. This is probably the record for long distance travelling by fern spores.

RED-ROOT AND THE PIGS.—There *is* a difference in pigs, notwithstanding the aphorism that "pigs is pigs." Harshberger's "Pastoral Botany" notes that the red-root (*Lachnanthes tinctoria*) is eaten without harm by black pigs but that it invariably poisons white ones. Examination of the bones of pigs poisoned in this way shows them to have been colored a reddish-pink. The plant ranges from Massachusetts to Florida growing in coastal bogs and in this region white pigs are consequently in the minority. The same volume records a similar connection between white cattle and sheep and the common St. John's wort (*Hypercium perforatum*). If such animals eat the plant, they are likely to develop an acute inflamation of the skin, but black-skinned cattle go unharmed. Apparently the trouble requires sunlight for development for if white skinned cattle are painted black with a mixture of charcoal and linseed oil, they too escape.

Consider the Hawthorns.—The craze for making new species in the hawthorn genus (*Crataegus*) having to a considerable extent subsided, it is possible to pause for a moment and take account of stock. When the hawthorn mania was at its height, there were supposed to be at least a thousand good species in the genus, but now, according to the second edition of Britton and Brown's "Illustrated Flora," the number has shrunk to some three hundred. In North America, from the Atlantic Ocean to the Mississippi Valley and from Virginia northward, there is reported to be 73 species. Eighty-four other forms are regarded as variations or possibly hybrids of those designated as distinct species and are relegated to synonomy. "Gray's Manual" is still more conservative, in this respect since it recognizes but 65 species. It also includes 44 "varieties" and thus really outdoes the Britton and Brown work which is regarded as fairly radical. Gray, however, reduces 34 other described species to synonyms. Even with Gray's liberality, some of the reputed species from Illinois fail to be mentioned at all. Since most of the recent species were named for botanists, botanizers, and their friends, this wholesale reduction to synonomy of botanical lights might be viewed as little short of a calamity. Still, in botany as in many other things, it may be better to have been named and reduced to synonomy than never to have been mentioned at all!

Dogbane Insect Traps.—In general, plants are pretty well adapted to their situation in life, but certain species appear to show the effects of over-specialization. This is especially true of devices for pollination which in several cases function so well from the mechanical side that they interfere with pollination by trapping the pollinating insects. The pockets in which the common milkweed conceals its pollinia often catch and hold visiting insects by the legs or tongue and thus cause their death. Several other plants, in the same family are known as "cruel plants" from their habit of catching insects in similar ways. One plant in particular has an arrangement, somewhat like the old-fashioned boot-jack, at the base of the pistil which allows insects to thrust their tongues through in search of nectar but which catches them on the return. The harder the insect struggles to release itself, the more firmly does its tongue become fixed in the trap. Traps of this nature are not confined to the milkweeds, however. They are found in the closely related dogbanes. A good illustration is found in the case of the common dogbane (*Apocynum androsaemifolium*) which, Raymond C. Osburn reports in *Ohio Journal of Science*, murders the little syrphid fly, *Mesogramma marginata*, by wholesale. As many as four flies have been found caught by a single small flower. Other flowers examined gave indications that the insects had been caught but had finally escaped by pulling off part of their proboscis or, not infrequently, by pulling their own heads off. A count of the first hundred flowers at hand showed that 81 had captured insects, the total number of captures being 140. Although the pinch-trap of these flowers is so much like that of their larger relatives, it appears that they do not hold even small insects unless their probosces are gummed up with the adhesive nectar. The flies were seen to enter one flower after another, only to be caught at last when their tongues were smeared with nctar.

A VARIETY OF VARIETIES.—In systematic botany, any form that did not appear distinct enough to be a species was once called a variety, but it has recently been pointed out that varieties may spring from different causes and thus be very different in value. There are, first of all, the variations properly classed as freaks and not to be included with regular variations. Of true varieties there are varieties due to geographical position, edaphic forms due to soil conditions, forms due to varying life cycles, such as annual forms of perennial species, seasonal forms due to temperature, elementary species and various color forms. There are also juvenile forms and perhaps others. The longer we study plants, the more there appears still to be learned about them.

DECADENT SPECIES.—An immense number of plants and animals have appeared on the earth and, after an existence extending over perhaps a million years, have declined and disappeared. We commonly assume the extinction of such forms to be due to untoward circumstances, such as sudden and extreme changes of climate, elevation or subsidence, the advent of more vigorous forms, the ravages of disease etc., but while all these forces may have played a part, there are some grounds for thinking that the species itself may have a more or less definite term of life and, as it were, carries its death warrant with it. It is often assumed that variation in animals and plants results in keeping each species fairly well adjusted to an environment that is not subject to sudden change, but recent observations on the ostrich incline the scientist to the idea that in this species, at least, there is an inherent tendency toward degeneration, already manifested in the character of the feathers, the loss of toes, and the lack of powers of flight. If this degeneration should continue, say the scientists, the ostrich is on the way out. Possibly many members of the ancient fauna and flora were similarly situated. Who knows that a given species can last forever? Is it not possible that species as a whole have a youth, maturity, old age and death similar to that of the individual?

EDIBLE FLOWERS.—Flowers and flower-buds are seldom used for food, though we must not overlook in this connection, the cauliflower, which is a sort of abnormal flower-cluster, the the true artichoke, which is a flower head, and capers and cloves, both buds. Rose petals and violet flowers are sometimes made into conserves, but one must go to the warmer regions of the earth to find flowers taking a prominent place on the bill of fare. One of the most conspicuous in this respect is the flower of the mahua tree (*Bassia latifolia*), a species belonging to the Sapotaceae. According to the *Quarterly* of the Royal Botanic Society of London more than a million people in India regularly use the flowers as an article of food. The consumption per individual is not far from eighty pounds annually. The tree blossoms in March and April, at which time the ground beneath it is carefully cleared to receive the thick, juicy, globular corollas as they fall. These are gathered by the women and children and spread out in the sun on mats to dry. A single tree will yield 300 pounds of blossoms a year. When fresh, the flowers are extremely sweet and often contain 40 to 70% of sugar. They have a peculiarly pungent taste and characteristic odor. They are eaten in both the fresh and the dried state and are cooked with rice, cocoanut, or flour. A second and different crop is later obtained from the same tree, for the seeds yield an edible fat called "Ilipe butter" which finds its greatest usefulness in the manufacture of soap and candles.

HAWTHORN VS. THORNAPPLE.—A good illustration of the indefiniteness of some common names is found in the terms applied to the species of *Crataegus*. The name hawthorn seems pretty well restricted to Europe and appears to be rarely used here except by those who get their common names from the books. In America the species are probably more commonly known as thorn-apples or haws. Frequently they are called red haws to distingunish them from the black haws

(*Viburnum*). There seems to be some question, however, as to how extensively thornapple or haw is used. Prof. J. C. Nelson writes that in southern Indiana and northern Kentucky he has never heard the term thornapple used. In other parts of the country, thorn-apple is the name regularly used though it is well understood that there are other plants that bear it, the jimson weed (*Datura*), for instance. It would be interesting to know to what extent haw, thornapple, and hawthorn is used for the plants in question.

ABSURDITIES OF NOMENCLATURE.—The exaltation of priority as a means of securing a stable nomenclature began about twenty-five years ago and has raged with more of less intensity ever since. The ornithologists are reported to have made the most progress toward the end in view but, as is usual when one becomes too deeply engrossed with a subject, they have pushed some forms of nomenclature to a point where they appear only ridiculous. Since there is some danger that botany, if not intelligently directed, may fall into the same errors, we may point out a few of the more conspicuous. To one interested in sanity in nomenclature, the most nonsensical custom is the doubling of the specific name in the case of the original variety or species. The common meadow lark, for instanse, in known as *Sternella magna, magna* which might be translated, we suppose, as the great, big meadow lark, just as *Spizella pusilla pusilla* must mean the tiny, little field sparrow and *Astragalinus tristis tristis* the sad, sad goldfinch. It was once thought that botanical names might claim the prize for nonsense with such absurdities as *Sassafras sassafras sassafras* and *Lablab lablab lablab* but these are quite overshadowed by *Cardinalis cardinalis cardinalis cardinal.* There is no use in arguing against it; the beauties of a binomial system of nomenclature are many, and the cardinalis combination is the gem of the whole collection.

THE ANCIENT FLORA.—Those unfamiliar with the early history of the American flora may have the impression that the plants we now see about us are the descendants of those which first lived in the locality and resemble them in general appearance, but nothing could be further from the facts. The flowering plants, especially, seem to be rather recent comers on our planet, comparatively speaking. There were perhaps millions of years during which the vegetation contained no example of a plant with flowers. Apparently mosses, algae, ferns and similar plants were much earlier. Since plants first began to be, great changes have taken place in the surface of the earth and there have been correspondingly great changes in the plant covering. The ages just preceding the present were particularly charactrized by such changes, and Edward W. Berry writes of them as follows: "During the upper Eocene and lower Oligocene the climate of our Gulf tier of States and southern Europe became strictly tropical and the region was overrun by an appropriate tropical vegetation while the temperate forests pushed into the polar regions until most if not all the lands within the Arctic Circle and part at least of the Antarctic continent were forested by cool temperature plants. The most extensive of these polar floras is that recorded from western Greenland (latitude 73°) which included nearly 300 different species. Eighteen of these are ferns, 28 are conifers including the ginkgo, incense cedar, cypress, and numerous sequoias and pines; 21 are monocotyls including two palms; and a vast abundance of dicotyledonous leaves of willow, poplar, alder hazel, beech, oak, elm, sycamore, walnut, ash, serviceberry, sumach, dogwood, gum, grape, magnolia, maple, holly, buckthorn, hawthorn, etc. Traces of this flora are found in Grinnell Land, Spitsbergen, Iceland, Siberia, and elsewhere to within 8 or 10° of the North Pole in a region that has since become a desert of snow and ice. In the southern United

States at that time one of the prominent features of the vegetation was the abundance of palms represented by the impressions of leaves and much petrified wood. Among the palms are *Thrinax, Bactrites* and *Palmetto,* and a well-marked date-palm is represented by characteristic seeds. Nutmegs are also represented by fruits, as are the copaiba gum, the sapodilla, and the carapa. The leaves preserved include mangrove, satin-wood, citrus, stopper, button-wood, canna, sea grape, climbing ferns (*Lygodium*), the tropical marsh fern (*Acrostichum*), the cinnamon fern, and many other tropical types. There were at least four separate times when ice-sheets accumulated over the land. Each of these lasted from 10,000 to 20,000 years, and they were separated by long intervals of genial climate known as the interglacial periods of thousands of years duration during which the floras spread northward to even beyond their present range. During the epochs of glaciation these temperate forests retired southward and gave way along the ice front to arctic willows and dwarf birches. The post- glacial amelioration of the climate, the opening to occupation of areas that had been covered with glaciers and the mixing of soil through ice action all combined to stimulate evolutionary activity in the plant kingdom, particularly among herbaceous forms. It seems probable that the characteristic Temperate Zone herbaceous families date from about this period.

EDITORIAL

A subscriber who recently ordered this magazine for three years in advance stipulated that if we should suspend publication during this period, we would return the amount of his unexpired subscription. In case any other reader has doubts of our stability, we may say that the number of subscriptions for the volume just beginning is so large that we have had to increase the number of copies printed, that volume *26* is already so rare that we cannot supply it except in complete sets and that there are only about twenty-five such sets still on hand. The magazine has not even considered the idea of suspending!

* * * *

One who has taken this magazine for a number of years writes, "I am not much of a botanist but find much in the magazine that is interesting if not exactly useful." This is the right spirit. Our correspondent realizes that one ought to know something about the plants whether the information can be turned into cash or not. Prospective subscribers sometimes write us that the magazine is too difficult for beginners, overlooking the fact that beginners do not long remain such and soon demand more advanced matter. Besides, who wants to take a publication that contains information with which one is already familiar? One needs a few articles somewhat beyond his reach to keep him up to the mark and furnish new food for thought. When a publication contains nothing that one does not already know, it is time to remove it from his list.

* * * *

For some time our National Government has been setting aside certain tracts of land valued for their scenic beauty for the use and enjoyment of all the people. Unfortunately for the safety of such tracts, they contain various streams and waterfalls which might be developed as sources of power and these have long been regarded with covetous eyes by certain private interests who would destroy the finest view on earth if it could be turned into dollars. It has been seriously suggested that the falls of Niagara would be much better employed in turning mill-wheels than running to waste for the delectation of visitors. In the past, all attempts of private individuals to turn our National Parks into profit for themselves have been defeated, but new schemes are constantly being brought forward and disguised as projects for benefitting the people of the region, may ultimately succeed if we are not eternally vigilant. It is likely that there is considerable water-power on the public lands, but this nation is certainly large enough and rich enough to spare an occasional waterfall simply for the pleasure its beauty gives. If a single company is allowed to begin water power development in our parks, others will follow and the damage will soon be irreparable. Those who believe that life is something more than mere existence should make it plain to those who represent them at Washington that our National Parks should not be exploited by private interests.

BOOKS AND WRITERS

Le Naturalist Canadien of Quebec, the only natural history publication outside of France which is printed in the French language, has recently received from the Province of Quebec, a subvention of $400 a year for the carrying on of its work. This is well merited recognition of *Le Naturalist Canadien* and the important part it plays in the education of the public. Both the magazine and the people of Canada are to be congratulated on the aid to science thus given. The United States, though possessed of infinitely greater wealth than Canada, allows its scientific publications to struggle along as best they can. We constantly boast of our scientific attainments, but as a nation we fail to adequately encourage the lines of work that make us great. Rich men endow universities, libraries, hospitals and laboratories, but the scientific press is pretty generally financed by scientific societies whose members often can ill afford the expense. It will be a great day for science when some person of wealth makes possible a truly great scientific journal by means of a modest subsidy.

The first two parts of "Pflanzen-Teratologie" by Dr. O. Penzig has been received from the publishers, Gebruder Borntrager, Berlin W.35, Germany. This is a truly monumental work on abnormal plants for which the author has been gathering material for more than twenty-five years. The abnormalities discussed fall into more than 150 divisions. The first part of the work is an enumeration of the articles relating to the subject arranged in chronological order under each author's name. Then follows a discussion of these departures from the normal, as observed for each species, aranged in systematic sequence, the part just received beginning with the Ranunculaceae and ending with the Hypericaceae. A more exhaustive treatise of this kind has apparently never been published. The work is in the German language and therefore not as useful on this side as if written in English, but those who read German will find it a most complete account of abnormal plants. The price of each part is 48 marks.

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JOLIET, ILL.

Vol. 27. No. 2 Whole Number 129

THE AMERICAN BOTANIST

MAY, 1921

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WILLARD N. CLUTE & CO.
JOLIET, ILLINOIS

The American Botanist

A Quarterly Journal of Economic & Ecological Botany

WILLARD N. CLUTE, EDITOR

SUBSCRIPTIONS.—The subscription price of this magazine is $1.50 a year or $2.50 for two years, payable strictly in advance. The magazine is not sent after subscriptions expire. Personal checks on small or distant banks must contain ten cents for collection fees. The magazine is issued on the 20th of February, May, August and November.

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MARSH AND DUNE, RESERVOIR CANYON

THE AMERICAN BOTANIST

VOL. XXVII. MAY, 1921. No. 2.

And all the mead was wide unrolled,
With green and silver, green and gold,
Where buttercups and daisies spun
Their shining tissues in the sun.
—Julia C. Dorr.

MIDSUMMER FLORA OF TUBA OASIS

By Willard N. Clute

IN the February number of this magazine I published a short account of the Painted Desert in Arizona and its most important oasis, Tuba. I have twice visited Tuba in quest of plants and upon my second trip, in the summer of 1920, I made a collection of all the visible plants of that interesting region. Since practically nothing has been written about the flora, it seems desirable to set down here a more circumstantial account of the plants observed, in the expectation that it may serve as the basis for further explorations.

Although my collection was made in July, it is probably more nearly complete than such a collection would be if made in a different climatic region or made at a different time in this one. The spring months are nearly rainless and many plants do not renew their growth or bloom until late in June or early July when the rainy season begins. There is, to be sure, an earlier burst of bloom at the end of the winter season, but if the flora of this earlier time contains annuals or herbaceous perennials that are not represented in summer, their disappearance is so complete as to leave no sign. The true desert plants are nearly all woody perennials and, of course, are conspicuous features of the desert at any time of the year.

The plants of the oasis, proper, are more often herbaceous perennials or, in some cases, annuals and are not limited to certain seasons of growth, as the other plants are, by a lack of water. The vegetation of the springs, seeps, rills and reservoirs is the usual one. The plants have the appearance of the water plants in other parts of the world and, in fact, consist of the identical species that inhabit more humid regions.

No matter from what direction Tuba is approached, the eye picks it out while still far distant, for the deep green of its spiry poplars and clustering fruit trees is in sharp contrast to the prevailing red and gray of the desert. After a long trip over the shifting sand dunes and bare rocks of the adjacent region the sight of its verdure is a most welcome one. The transition from desert to arable land at Tuba is always so sudden as to be noticeable. The hot red sands come up to the very edge of the oasis and push in wherever the boundaries are not defended by water. The oasis itself is so circumscribed as to appear like an island. There is no spot within its confines from which the desert is not visible

Owing to the close contact of the desert and oasis, it is sometimes difficult to decide to which region certain plants on the border-land belong. In making up the accompanying list, however, I have chosen to exclude those species that are found pretty generally distributed in the desert, aiming in this discussion to present only those plants that one might expect to find in any locality in the desert where water comes to the surface. In a later paper the flora of the desert, itself, will be considered.

The arborescent flora of the oasis is limited to the species brought in by the white inhabitants. Most important and conspicuous are the Lombardy poplars which are so constantly associated with Mormon settlements as to be known as the Mormon tree. No other tree in the desert seems to thrive so well. A list of the other shade-trees includes the Arizona cottonwood, mulberry, catalpa, ailanthus, osage orange, and honey locust. One of the principal industries of the region is that of fruit growing. Apples are extensively planted and in smaller numbers are found peaches, apricots, pears, almonds, and occasionally a cherry. I saw no cultivated plums but a wild plum (*Prunus Americano*) clustered close to the cultivated fields may have served as a substitute.

One of the surprising things connected with the flora is the fact that exclusive of cultivated plants, fewer than seventy-five species, practically all of which are weeds of wide distribution, are found in the oasis. One seems warranted in the inference that cultivation of the soil has destroyed such native plants as once existed and made room for the usual companions of our cultivated crops. More than thirty percent are of Old World origin and forty percent of the others are American plants of wide distribution, at least in the western half of our country. Only a mere handful have been derived from nearby regions or from the desert, notwithstanding the intimate contact of the two areas. Only four species have fruit adapted to being distributed by birds, and three others possess burs which might be distributed by animals. All the rest are adapted for wind distribution, being either winged, equipped with a pappus, having dustlike seeds, or of the form known as tumble-weeds

The plants in this list have been kindly identified for me by Dr. P. A. Rydberg of the New York Botanical Garden whose familiarity with western plants is attested in his "Flora of the Rocky Mountains" and other publications. The names here used differ in some respects from those sanctioned by the Vienna Code, but the differences are never great enough to cause confusion. The numbers following the species are the numbers under which they were collected.

LIST OF SPECIES

Equisetum intermedium (A. A. Eaton). Fernworts are seldom found in the desert. This species was frequent in wet places. The remains of fertile catkins indicate that its season of fruiting is much earlier. 132.

Adiantum rimicola Slosson. VENUS' HAIR FERN. About a dozen plants were found under a sandstone cliff at Reservoir Canyon. The species is what is ordinarily known as *Adiantum capillus-veneris*. 88

Typha latifolia. L. CAT-TAIL. This common inhabitant of wet places was more luxuriant than I have ever seen it elsewhere, reaching a height of ten feet or more. At Reservoir Canyon and in reservoirs at Tuba.

Polypogon monspeliensis (L.). This small grass, a native of Europe, may be found in many moist spots. It has much the aspect of the common corn grass (*Setaria*) but is much smaller. Stock is not very fond of it. 124

Phragmites Phragmites (L.). REED. A reed-like grass well known for its tall culms in wet places. At Tuba the leaves are always covered with green plant lice. 85

Distichlis stricta (Torr). SALT-GRASS. Abundant on the Government farm in Moenkopi Wash and elsewhere. Called "Johnson grass." It spreads by underground runners, is hard to eradicate, and is regarded as a pest. 66

Cenchrus Carolinianus Walt. SAND-BUR. This familiar plant finds the sandy soil of the orchard at Tuba quite to its liking. 92

Eleocharis palustris L. A characteristic wet-ground plant throughout most of the United States and very abundant in Moenkopi.

Scirpus Americanus Pers. THREE-SQUARE. Another widely distributed plant plentiful in wet places. 80

Scirpus occidentalis (Wats.) BULL-RUSH. This giant rush is similar in appearance to the lake rush (*S. lacustris*) of which it is sometimes regarded as a variety. Characteristic colonies are found in several of the reservoirs. Cattle are fond of it and wade into the water for it. 128

Juncus Torreyi Coville. Plentiful in dryish soil. 67

Juncus Mexicanus Willd. In rather dryish places abundant. 65

Yucca sp? Two kinds of yucca are abundant in the desert and may be found in the oasis. They were in full fruit in 1919 but for some reason failed to fruit in 1920 and could not be identified. The yucca seems destined soon to disappear since the immature plants are eaten by sheep and goats.

Serapis gigantea (Dougl.) HELLEBORINE. Apparently the only orchid in the oasis. A considerable colony was found about the large reservoir at Tuba. 83

Salsola pestifer A. Nels. RUSSIAN THISTLE. This well known plant is very abundant in the desert, often in pure sand, and is equally plentiful in the oasis. The young plants are readily eaten by all kinds of stock. 10

Atriplex hastata L. This is the species that is found in waste grounds throughout the United States but is here a bit thicker and scurfier as befits a desert inhabitant. 63

Atriplex spatiosa A. Nels. A species with much the appearance of *A. hastata* common along the roadside at Tuba. It is not included in the Flora of New Mexico and its center of distribution is much farther north. 127

Atriplex canescens (Pursh) SALT-BUSH. Plentiful near the school at Moenkopi. It is one of the most abundant plants on the plains and is often called chamiso and sage-brush. It is not, however, the plant usually designated as sage-brush. 5.

Amaranthus blitoides S. Wats. SPREADING PIG-WEED. This common weed was abundant in the gardens at Tuba.

Trypterocalyx cyclopterus (A. Gray) SAND VERBENA. In waste ground. After flowering the fruits develop broad wings which make the plant very conspicuous. 95.

Portulaca oleracea L. PURSLANE. Very common. This plant is occasionally eaten as a pot-herb, but I could not discover that the Indians made use of it though their food plants are very limited as to variety.

Clematis ligusticifolia Nutt. VIRGIN'S BOWER. This is the western analogue of *C. Virginiana*. It climbs over the vegetation in many places and is especially luxuriant at Reservoir Canyon. It thrives in cultivation and its thicker, darker foliage makes it rather superior to the common form for such purposes. 86.

Batrachium tricophyllum (Chaix). WHITE WATER-CROWFOOT. A few specimens were found in a reservoir at Tuba, probably carried thither on the plumage of water birds. 130.

Halerpestis cymbalaria (Pursh) SEA-SIDE CROWFOOT. The common name of this buttercup is scarcely appropriate for a species that is abundantly distributed over the desert. Found in many moist spots and very plentiful in Moenkopi Wash. 98.

Pleurophragma platypodum Rydb. In dry ground not far from streams. The plants put up flowering shoots, often six feet high, from a tuberous root. The rosette of leaves has usually perished by the time the flowers open. 82.

Sisymbrium nasturtium--aquaticum L. WATER-CRESS. Abundant in many rills with all the appearance of a native. It may have been introduced, but this is not likely. 107.

Diplotaxis muralis L. SAND ROCKET. A small colony was found near the Indian School. This is a widely distributed European weed. It is reported from California but is not mentioned in the Flora of New Mexico. 111.

Peritoma serrulatum (Pursh). ROCKY MOUNTAIN BEE-PLANT. This plant with the aspect of the garden spider-flower (*Cleome*) is very abundant. The pink flowers with long exserted stamens renders the plant rather attractive though the herbage is malodorous. 11.

Wizlizenia refracta Engelm. YELLOW CLEOME. This is the most abundant weed in the region. It blooms when from three inches to three feet high, depending on the soil and moisture. Apparently a good bee plant. It is reported to range from Texas to southern New Mexico but is apparently rapidly extending its territory. 57.

Rosa Arizonica Rydb. Abundant along the rill from the largest spring in Tuba. In July the plants were well set with bright red fruits. 106.

Glycerrhiza lepidota Nutt. WILD LIQUORICE. A widely distributed plant with dense racemes of cream-white flowers followed by prickly pods. Plentiful in the orchard at Tuba where it is regarded as a weed. 77.

Rydbergiella praelonga (Sheld). Specimens of this much-named and variable species were found in fruit north of Tuba. Frequently listed as *Astragalus praelonga.* 121.

Linum pratense (Norton). WILD BLUE FLAX. A few specimens of this segregate from *L. Lewisii* were found on a springy bank west of Tuba. Not reported from New Mexico. 116.

(TO BE CONCLUDED.)

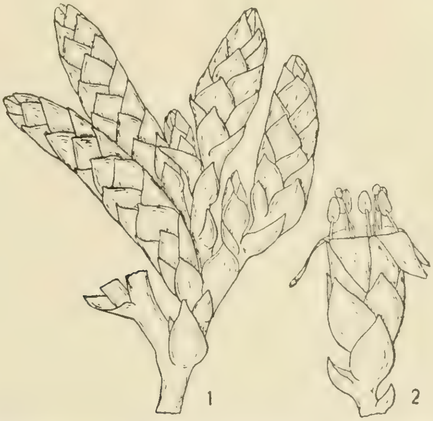
A CURIOUS ABNORMALITY IN CUSCUTA CUSPIDATA

By T. G. YUNKER.

RECENTLY the writer had the privilege of examining a number of specimens of *Cuscuta* that Mr. C. C. Deam, State Forester for the State of Indiana had collected in that state during the summer of 1920. Among the specimens was a collection of *Cuscuta cuspidata* Engl. which Mr. Deam states was found about two miles south of New Hormony, Posey County. The presence of this species as far east as Indiana is in itself an interesting fact, the writer knowing of only one other specimen having been found in the state. This specimen, however, shows an interesting teratological condition that will bear reporting upon, it is believed, inasmuch as there is no record, so far as known, of this condition occurring in any species of *Cuscuta*.

Upon first observation the specimen was seen to be a *Cuscuta* but it showed no resemblance to anything ever seen before by the writer. All of the flowers had apparently become spikelets made up of bracts. Closer observation revealed a few normal flowers of *Cuscuta cuspidata* and also some which showed a transition from the normal flower to the complete spikelet formation. Had it not been for the presence of some normal flowers in the specimen exact determination of the species would have been difficult. The inflorescence appeared about normal for the species with the spikelets occurring in the place of flowers. The spikelets were of lengths varying from about a quarter of an inch to half an inch and were terete. There was no indication that the spikelets had reached their maximum length and it is not known how long they might have become had they been allowed to continue growing.

Careful dissection of a number of the spikelets failed to reveal the least indication of floral parts. The bracts making up the spikelet are of the same shape and character as those composing the bracts and calyx of a normal flower.



1.—Abnormal inflorescence of Cuscuta cuspidata. 2.—Normal flower, Both enlarged about 5 times.

The host was *Ambrosia trifida*. This plant is frequently attacked by *C. cuspidata* without causing any abnormal flowers so one can conclude that the host probably had no influence in the production of the spikelets. One suspects in a condition of this kind that perhaps an insect or fungous pest may have brought about the abnormality, but careful dissection and microscopic examination of the spikelets and of the stems in the vicinity of the inflorescence failed to reveal anything that would indicate the presence of either an insect or fungous cause.

PLANT NAMES AND THEIR MEANINGS---VII

LILIACEAE—II

By Willard N. Clute

THE Liliaceae, or lily family, includes two very different groups of plants., One group with characteristic lily-like flowers, is so distinct in appearance that the casual observer would readily identify most of the species; the other, with flowers constructed on the lily pattern, is yet noticeable different and its members are often a source of perplexity to the beginner, though easily distinguished by the more experienced student. It happens, therefore, that many plants called lilies by the novice are not true lilies in the sense of belonging to the genus *Lilium*, while others are scarcely recognized as lilyworts though true members of the Liliaceae. In most cases the difficulty is not in recognizing the lilies, but in distinguishing the small points of difference that separate one genus from another.

In the Eastern United States, or rather in the region usually covered by the Manuals, there are only three species of lily that have acquired vernacular names. The first of these to bloom is *Lilium Philadelphicum*. It is partial to forested areas where its large, erect, deep-red cups are common and conspicuous. It is therefore appropriately called "wood lily," "red lily," "glade lily," "wild orange lily," and, possibly "huckleberry lily." Whether "flame lily" and "fire lily" also allude to the color of the flowers or to the fact that these are often the only flowers seen after a fire has swept through the woodlands, is hard to determine. "Philadelphia lily" is, of course, merely a translation of the specific name given to the plant because it was first known from the region of Philadelphia. The name of "tiger lily" belongs by rights to *Lilium tigrinum* but it is often carelessly applied to this plant. *Lilium Canadense* is a common lily of open grassy places. Its nodding bells, which may be either yellow or red are often seen in meadows and thickets. It is probably most frequently known as "wild red" or "wild yellow" lily. "Field lily" alludes to its place of growth, as "nodding lily" does to its habit of growth, while "Canada lily" is merely a translation of its specific name. The flowers of *Lilium superbum* are half nodding and the segments are rolled back in such a way as to suggest a turban. The species is commonly known as "Turk's cap" or "Turk's head," though the name is imported and belongs to the true Turk's cap" (*Lilium martagon*) of Europe. Our species also resembles the "tiger lily" (*Lilium tigrinum*) of China and Japan and is often called "tiger lily," or "nodding tiger lily" in consequence. The real "tiger lily" is occasionally found as an escape in our region.

Another Old World plant rather extensively naturalized here, which bears the name of "tiger lily" is a species of *Hemerocallis* better known as the "orange day lily" (*H. fulva*,) The name "day lily," like the generic name, refers to the evanescent nature of the flowers, though it may be said that they frequently last longer than a day. The name of Eve's thread, reported to be applied to this species, is doubtless due to its being confused with some species of yucca, while "fire lily" is clearly a misnomer. A second species of *Hemerocallis* (*H. flava*) with yellow flowers is the "lemon lily" or "yellow day lily" while two species with orange bells that bloom earlier are known as "copper lilies" (*H. Dumortierii* and *H. Fortunei.*) The species of *Funkia* usually known as "plantain lilies" are sometimes called "day lilies." The species most frequently known thus is the "white day lily" (*F. grandiflora.*) The leaves of these plants are short, broad and heavily veined like those of the common plantain, which probably suggests the name of "plantain lily."

The lily-like flowers of the *Erythroniums* have caused them to be known in some places as "yellow lilies" and "yellow bells." They are far more frequently known as "adder's tongues" a name to which the leaves, spotted like an adder, give significance. To this circumstance also we probably owe such appellations as "snake-root," "rattlesnake violet" and lamb's tongues." "Trout lily," "fawn lily" and trout flower" are book names of recent origin invented by sentimentalists who may dislike to associate these handsome flowers with reptiles. A very ancient name for this plant is "dog-tooth violet." This was bestowed upon it at a time when violet might mean any conspicuous flower. The shape of the petals in the European species like a dog's tooth, is said to be responsible for the first part of the name and the same idea is indicated in its specific name, *dens canis*. The term "yellow hookers", by which the flowers of *Erythronium Americanum* are known in parts of Pennsylvania, appears to be another reference to violets since hooker is a common term for violets there. *Erythronium albidum* is known as "spring lily," "deer-tongue," "white adder's-tongue" and "white dog-tooth violet," all of which are intelligible in the light of what has already been said of the yellow species.

The largest species of *Trillium* is often known as "wood lily." This is *Trillium grandiflorum*, a magnificent flower that often dominated the underwoods just as the trees are putting out their leaves. Although not a lily, the name fits very well. This plant also bears the name of "Trinity lily," all of its parts being in conspicuous whorls of three. Had the plant existed in Ireland, it is probable that there would now be less discussion as to the identity of the shamrock on the seventeenth of March. Most of the species of *Trillium* are known as "wake-robins" and this one is called the "large-flowered wake-robin." The original "wake-robin" is the "cuckoo-pint" (*Arum maculatum*) of Europe. This latter species has three-parted leaves which seems to have been warrant enough for the transfer of the common name to our plant by the early colonists, regardless of the numerous differences between the species.

The dull, red flowers of *Trillium erectum* are so out of the usual order that they have attracted the attention of even the unbotanical, as numerous common names attest. Among these are "red trillium," "purple trillium," "nose-bleed," and "red benjamins." The word "benjamin" appears to have been derived from *benzoin* through *benjoin*. Our plant, is of course, only distantly related to the true benzoin but its use in medicine may have suggested its name. The plant once had some repute among the Indians for medicinal qualities, hence "squaw-root," "birth-root" and its variants "beth-root" and "bath-root." The species is also called "shamrock" in allusion to its three leaves. The odor of the flowers, suggesting that of a wet dog, is responsible for "ill-scented trillium" and "dog-flower." I am at a loss to account for such names as "lamb's quarters," "bumble-bee-root," "true-love" and "orange blossoms." "Herb Paris" is a misnomer. The plant entitled to this name is *Paris quadrifolia* of Europe, a member of the trillium family. Since all the *Trilliums* are American, their vernacular names must have been acquired or transferred from other species since the country began to be settled.

The reputed medicinal virtues of the *Trilliums* are again reflected in such names as "cough root," "snake-bite" and "rattlesnake-root" applied to *Trillium cernuum*. The last two names may perhaps refer to the shape of the rootstock which terminates suddenly as if bitten off. This is another plant called "white benjamins." The drooping habit of the plant makes "nodding wake-robin" appropriate, and "ground lily" is of obvious application, but why it should have been called "Jew's-harp plant" is hard to imagine. *Trillium undulatum*, with pencilled lines of purple deep in the corolla, is the "painted wake-robin." This is also another of the "benjamins." "Wild pepper" is a name given to the plant in allusion to the hot biting sensation experienced when the root stock is chewed. The lurid flowers of *Trillium sessile* bear the names of "nose-bleed," "bloody noses" and "bloody butcher." The plant is also known as "three-leaved nightshade." *Trillium nivale* is the "snowy trillium" as its specific name indicates. It is the smallest, earliest, and one of the most interesting of its tribe, coming at the time of the hepatica and bloodroot. It is also known as the "snowy" or "dwarf trillium." The snowy part of its name probably refers to the snow-white blossoms but the precocious flowers are often snowy for other causes. The only other American genus included with *Trillium* when these plants are separated as a distinct family, is *Medeola*, whose one species is known as "cucumber-root." If one digs down at the base of this plant he will come to a short, crisp, conical white rootstock which is edible and whose flavor at once suggests the common name.

Few of the *Alliums* are valued for their flowers and but for more plebeian uses these plants would be little known. They are, however, close kin to the regal lily and are properly included here. The word "onion," by which most of the species are known, is an old term derived from the French *oignon* which is in turn derived from the Latin *unio* signifying unity. The word "onion" signifying a large pearl is also derived from *unio* but the identical word, says the dictionary, may not have served for both derivations. "Garlic" is another ancient name from the Anglo-Saxon *gar* meaning a spear or lance, and *leac* the wild leek. The word, leek, itself, is found as a variant in many of the languages of central and northern Europe and the "gar-leek" was evidently only another kind of leek with round spearshaped leaves instead of the flat leaves of the common species. The "chives" (*Allium schoenoprasum*) is in like manner called "rush garlic." "Chives," it appears, comes from the French *cives,* supposed to have been derived from the Latin *Cepa,* the specific name of the common onion. "Cives," therefore, seems to be the better spelling of the name. *Allium vineale* is known as "field garlic" and "crow garlic." The latter name is unintelligible unless it denotes the worthless qualities of this plant.

Although practically all the lilyworts are perennials, there are very few that are evergreen and still fewer, in our climate that are woody. In fact, the genus *Smilax* contains all the representatives of the latter kind. From the circumstance that the stems of certain species are armed with prickles and remain green all winter, they are called "cat-briers" and green-briers." The common *Smilax rotundifolia* has accumulated the largest number of vernacular names. Of these "horse-brier," "wait-a-bit," and devil's hop-vine" are of obvious derivation. "Bamboo brier" apparently alludes to the similarity of the stem structure to that of some of the rattans which are occasionally known as bamboos. "Hungry-vine" possibly refers to the way in which the vines cover up other plants, though in view of such other names as "biscuit leaves," and "bread-and-butter," there may be a more appropriate meaning which has escaped me. "Nigger-head" probably alludes to the round clusters of black fruit.

Smilax pseuda-China is known as "bull-brier" and "false China-root." The true "China-root," it may be said, is an Old World plant, also a species of *Smilax* (*S. China*). Several of the North American species, notably *S. Walteri*, *S. glauca*, and *S. pseuda-China* are known as "sarsaparilla," but none yield the drug familiarly known by that name. The drug is the rootstock of *S. officinalis* and *S. medica*, tropical members of the genus. The word "sarsaparilla" is reported to come from the Spanish *sarzaparilla* from *sarza*, a bramble, and *Parillo*, the name of the physician who discovered the virtues of the plants. *Smilax Walteri* is also known as "red-berried bamboo," and *S. lanceolata* now comes to market for decorative purposes under the name of "Jackson vine" with no obvious meaning. The name of "stretch-berry" is given to *S. bona-nox* because the pulp of the fruit is elastic. *Smilax glauca* is the "saw-brier.

Two herbaceous species of *Smilax* are known as "carrion-flowers." The most conspicuous is *S. herbacea*, one of the plant is also called "Jacob's ladder" in allusion to the graceful stems and leaves. The second species is not even vine-like and lacks tendrils as its specific name, *ecirrhata*, indicates.

OREGON WILLOWS

By R. V. Bradshaw.

EUGENE, OREGON, the site of the State University, is located between two buttes. Skinner's Butte is situated directly on the north side of the city, the railroad being near to its base. The Williamette River, which flows in a general northwest course, is not far from it on the north. The butte has a good automobile road which leads to the summit, where a fine view of the City, the Williamette Valley, and the Three Sisters—a trio of snowy peaks—can be had. Spencer's Butte, 2063 feet high, the prominent landmark of the locality, is about six miles south of Eugene. The crest of this is crowned by huge rocks on which can be found the lace fern. It is said that on a very clear day the Pacific Ocean can be traced in hazy outlines in the west. I might add here that besides several rare botanical specimens, I have collected an excellent representative of *Crotalus lucifer* on the summit.

Besides three cultivated willows, seven native species are to be found about Eugene. The three grown for ornament are the familiar weeping willow, crack willow, and goat willow. *Salix Scouleriana,* which the children call the pussy-willow, is the first of the wild ones to bloom. Although very abundant along the Williamette River, it can be seen growing around Spencer's Butte and other places in the woods afar from streams. The catkins come out long before the leaves. The pistillate aments are noted for the pubescent capsules. The scales are dark brown or black. The bark has a peculiar strong odor which to some is not pleasant. The leaves of this tree are not of the well-known type, but are very large and broad.

Salix Piperi comes out a little later; it is also popular with everyone and is much used for decoration. This is common along the streams and rivers and rarely very far from them. This also comes under the designation of pussy-willow, for the flowers come out ordinarily either before or with a few small leaves or leafy bracts. The twigs are a light golden brown and are very brittle. The ament scales are dark, but the capsules are not pubescent. The leaves are rather silvery or light colored beneath.

The silky willow, *Salix sitchensis,* is a very beautiful shrub or tree on account of the leaves, which are very dark green above and covered with silky pubescence beneath. Although this species, in my estimation, is well worth knowing, it is rarely noticed as it does not belong to the pussy-willow type. It is more abundant along streams or rivers. The catkins are long and slender. The staminate have one stamen to a scale, the scales being light brown in color. The pistillate aments have pubescent capsules. After the silky willow, *Salix Mackenziana* begins to show its long pointed catkins, the bright red anthers at the tip of the ament contrasting well with the older yellow ones at the base. These flowers come out with the bright green leaves. The scales are light brown, and the capsules are smooth. Some of the leaves are cordate at the base, and are often glaucus beneath.

The gland willow, *Salix lasiandra* var. *Lyallii* is a very gorgeous species, but in spite of this it blooms quite unnoticed for most of the trees are leaved out and the other flowers are abundant. The common name is given on account of the glands where the petiole joins the blade. This species reaches the height of a tree and is common about sloughs and situations where the water stands on the ground part of the year. The tree is easily recognized from afar by the bark, which is furrowed longitudinally. There are five or more stamens to a scale, the scales being a light yellow in color. The capsules are smooth.

Nuttall, in his North American Silva, said of *Salix sessilifolia*:

"This beautiful and very distinct species of willow formed dense tufts on the rocky borders of the Oregon, at the confluence of the Wahlamet, attaining to the height of about six to eight feet, and when in flower appeared as showy as a Mimosa." I quite agree with Nuttall, as to the appearance of this willow. The flowers come out with the leaves which are very soft to the touch—Nuttall likened them to velvet—and are made noticeable amid the surounding river vegetation by the lemon-yellow catkins and the soft sage green color of the leaves. Later in the season—the species blooms in June or the latter part of May—the leaves lose much of the soft pubescence, but retain the peculiar color. This willow is very common about the Williamette River near Eugene.

The sandbar willow, *Salix melanopsis bolanderiana* is very similar to its near relative, the soft-leaved willow (*S. sessilifolia*), but is not so beautiful. The catkins are similar in shape and color, but the capsules are not as densely pubescent. The leaves lack that wonderful softness to the touch, and are often devoid of pubescence. This species is very common on the sandbars, and is very attractive in appearance in the winter, when the leaves are gone, due to the bright red or yellow color of the twigs of the slender bushes, which are not ashy as in the case of the soft-leaved willow.

The willows make very attractive herbarium specimens, when one has the leaves mounted on the cardboard with the catkins. They are especially beautiful, when the capsules are partly open and the seeds are escaping. But better than the dried specimens are the living willows themselves.

A REMINISCENCE OF ROSES

BY S. B. PARISH

WELL do I remember the hawthorn hedge that shut in the privacy of an ancient mansion near the city which was my boyhood's home. It was the "Cockloft Hall," of some of Irving's earliest essays, and was a bit of rural England in architecture and surroundings. I must admit that the hedge was somewhat ragged and unthrifty, evidently unfited to accomodate itself to this new world. But the eglantine, whose errant branches overhung the gateway arch, found itself quite at ease, content with its lot, and giving contentment to the passerby. How sweet the fragrance of its foliage, how delicate the pink beauty of its blossoms!

Later, in one of the Gulf States, I came to know the Cherokee rose, clambering over fences and trees by the roadsides, its masses of shining verdure set off with abundant bloom of purest white. It seemed a true American, so full was it of vigor, so impatient of restraint. One learned with surprise,—indeed, with a certain chagrin,—that it, too, was an immigrant, and an Asiatic at that. But it must have established itself at a very early period, for in 1803, Michaux had no suspicion of its foreign origin when he gave it its first botanical name, *Rosa laevigata,* and designated Georgia as its habitat. Thus, by the rules of botanical nomenclature, an American State becomes the "type locality" of a Chinese rose.

I have never again seen the eglantine, but some thirty odd years ago I renewed my acquaintance with the Cherokee rose, in a town in southern California, where I came upon it leaning from the coping of a retaining wall, which is quite concealed beneath its green luxuriance. It was then just begining to make its appearance in California, but where it is now common in cultivation in many parts of the State, but does not escape as in the Gulf States.

I suppose I shal quite lose caste with rosarians when I confess my preference for the single roses over the choisest hybrids of the garden. Those favorites are indeed beauties, but a trifle over-dressed, a trifle rouged and enamaled. I like better the slender symmetry, the pure blush, of their maiden sisters, and it is by these graces that the wild roses attract me. Here in California they haunt the borders of brooks, of meadows and of copses, where moisture is to be found for their roots, and where they can spread in the sunshine their evanescent petals of delicate pink. When I first knew them we were content to count but four species for the whole State; but those were simple days. Now the activity of systematists has divided and sub-divided them, until the latest monographer is able to enumerate thirty. The trained taxonomist is not always successful in discriminating them, but the more fortunate gatherer of wild flowers may leave him to his puzzles and be happily content to call them all "Wild Roses."

TWO NEW SPECIES FROM ARIZONA

ERIOGONUM CLUTEI Rydberg, sp. nov.

Annual, stem ¾ dm. high, glabrous, glaucous, striate, somewhat fusiform-thickened below the nodes, di- or tri-chotomously branched, the lower nodes 5-10 cm. long; basal leaves petioled, the petioles 1-3 cm. long, the blades reniform, 1-1.5 cm. long, fully as broad, white-floccose on both sides, rather thick ;stem-leaves verticillate, reduced to small scales, ½ mm. long, lanceolate to broadly triangular; pedicels slender, 5-20 mm. long, erect, in the axils of the forks or racemosely arranged on the ultimate branches; involucre turbintae or obocnic, 1-1.25 mm. long, about 0.75 mm. broad, glabrous, the lobes ovate, acute; periant yellow, 2.5-3 mm. long, densely white-pilose without, the lobes lanceolate, acute; fruit unknown.

This is a member of the section PEDUNCULATA and most closely related to *Eriogonum Ordii* S. Wats. It agrees with the description of that species except in the following points: The perianth is yellow not white with pink tips, the hairs of the perianth are longer, and the leaf-blades are not tapering at the base.

Type collected at Cameron, in the driest part of the desert near Tuba, Arizona, July 15-31, 1920, *W. N. Clute 71a* (Herb. N. Y. Bot. Garden).

FORESTIERA ARIZONICA (A.Gray) Rydberg.

Forestiera nomexicana arizonica A. Gray. Syn. Fl. 21:76. 1878.

This is a more stunted and thick-branched shrub than *F. neomexicana.* The branches, leaves, and even the fruit is densely soft-pubescent when young. The leaves are broader, obovate rather than oblanceolate and short-petioled; in age they become glabrate; they are entire or crenulate and thicker than in *F. neomexicana.* The fruit is comparatively shorter and thicker, about 6 mm. long and 4.5 mm. thick, in age glabrous and black. The pubescence of the twigs is more permanent, remaining throughout the first season. In the herbarium ofthe New York Botanical Garden, there are the following specimens:

ARIZONA: Prescott, 1876. *E. Palmer* 580 (duplicate of type, in flower); Desert near Tuba, July 15-31, 1920. *W. N. Clute* 118 (fruit).

New Mexico: Lincoln, May 8-19, 1902, *F. S. Earle 667*. (young fruit).

OWNERS OF COMPLETE SETS

In view of the small number of complete sets of the *American Botanist* in existence, it is desirable that a list of the owners be made. Below we give the list as far as known. If there are others who possess a full set, we should be glad to have the information. To own a full set will soon be a mark of distinction.

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NOTE *and* COMMENT

THE AMATEUR BOTANIST.—Till very recently, whole sciences, such as taxonomy and zoegeography, entomology and genetics were almost entirely in the hands of amateurs. Mendel was an amateur and all the wonderful varieties of our domestic animals and plants were developed, one might almost say, invented, by amateurs. The change which has come over the situation is due to the great increase in our knowledge in more recent times and the exuberant growth of our universities, technical schools, museums and research institutions. These have made investigation more and more difficult for the amateur, especially in the organic sciences and physiology which now demand an exacting preparation and elaborate apparatus, although there are even at the present time a few eminent amateur astronomers and geologists. Amateurs still abound, nevertheless, in zoology and botany, in which it is still possible to carry on much valuable research with very simple equipment. There must be thousands of them and nothing is more extraordinary than the ignorance of their work on the part of many of our university professionals. I could give a long list of men in the most diverse professions whose researches have greatly enriched entomology and other departments of zoology. In such vast and complicated sciences as biology and archeology the work of the amateur is so much needed and so worthy of encouragement that we may regard it as one of the greatest defects in our educational system that a youth is ever able to leave the science courses in a high school or college and take up the humblest calling without a fixed determination to fill at least a portion of this leisure hours with the joys of research.—*W. M. Wheeler in Science.*

EDUCATING WILD PLANTS.—Those who attempt to introduce wild plants into their gardens by means of seeds, often find it difficult to get the plants established in this way. Although they seem to grow well enough in their native haunts, they are slow to germinate in cultivation or fail to come up at all. It is likely that we unconsciously contribute to this failure by treating the seeds differently than they are treated in nature. For instance, we are likely to keep them in a dry room over winter when they are accustomed to lie in the cold and sodden ground through that season. It appears, however, that when wildflowers are introduced into cultivation and propagated by means of their seeds, the slowness to sprout wears off and thereafter they grow readily. Mrs. S. B. Walker writes that this is the case with *Gillia aggregata, Salvia grandiflora, Lepachys,* columbine and a number of others. The plants seem to become educated to the different conditions in which they are obliged to grow. A scientific explanation of the facts seems to be that only those seeds which can grow at all in such situations are likely to leave descendants and since children are like their parents, there is soon bred up from these a race of plants that is amenble to garden cultivation by the elimination of those less able to survive in such situations.

TAWNY DAY LILY.—The commonest member of the genus *Hemerocallis* in the United States is undoubtedly that reddish-yellow species known as the tawny day lily (*H. fulva*). It is the most aggressive of its clan, thoroughly satisfied with our soil and climate, and when thrown out of the garden for crowding, thrives on rubbish heaps and along roadsides. Notwithstanding its vigor and amiability, it is seldom held in high esteem by the gardener, but N. M. Grier has discovered a new characteristic which makes it worthy of attention. He finds that this plant rarely if ever sets seeds. After a number of experiments he has been unable to induce the plants to fruit at all. The sterility of the plant was hinted at as long ago as Sprengel's time, but it was then thought that this condition was due to the absence of the pollinating insect. This, however, appears not to be the case for numerous flowers were hand-pollinated, some with their own pollen and some with pollen from other flowers without effect. Linnaeus regarded this species and the lemon lily (*H. flava*) as two forms of a composite species but crosses between the two produced no progeny. It may be possible that in this plant we have another illustration of the fact that plants which spread by vegetative means often are slow to fruit. If any of our readers have seen this species with seeds, we hope to hear from them.

ADAPTATION TO ENVIORNMENT.—One of the premises upon which the theory of evolution rests, is that new forms originate through the adjustment of species to their environment. It may be pointed out, however, that just because a new form originates in a given region is no reason for assuming that it is better adjusted to that region than to any other. Our experience with weeds is an abundant daily refutation of the idea. A plant is primarily a weed when it thrives in a locality better than the natives do. It then invades cultivated grounds and vies with the rightful plants for possession. We know, however, of many species that in their native haunts are not particularly obnoxious but when taken abroad have grown with astonishing luxuriance. This clearly show that the new region better meets their needs than the one in which they originated. Plants, therefore, may often be better adapted to live in a remote region than in the one in which they are found native.

WITCH HAZEL GOES WEST.—One of the shrubs selected for experiment in a series of acclimatization studies carried on by the Desert Botanical Laboratory in Arizona was the witch hazel (*Hamamelis Virginiana.*) This species has a reported range from Canada to Texas, blooming in autumn in northern regions and in early spring in the southern. It is likely that the southern plant is a different species, but this is not important in the present instance, since all the plants selected were from northern stock accustomed to blossoming from October to December. When transferred to Arizona, however, the plants bloomed in early July of about a hundred days after growth was resumed in spring. Seeds were ripe in January and February, whereas the fruits in New England require practically a full year to mature.

MULTIPLE NOMENCLATURE.— In flower nomenclature, botanists have been altogether too lavish in their terms to the great disgust of the teacher who finds it necessary to teach all of them to each pupil in order that they may be sure to get past the college professor who is committed to his own brand of names. When the pessimists begin to ask what is the matter with botany, it might be well to look into this phase of the matter. When the petals are entirely separate and distinct, the flower is often said to be polypetalous but the meaning of this word makes it inapplicable. It is from the Greek *polys* many and *petalon,* a leaf or petal. Another term used is eleutheropetalous which is from the Greek *eleutheros,* free, and *petalon.* The word is rather too long for this fast age and choripetalous has been suggested as a substitute for it. This is form the Greek *choris,* separate, and the word for petal and exactly expresses it. Still another word is dialypetalous, the first part of which comes from *dia,* asunder and *lyin,* to loose. A similar condition exists in the terminology of united petals. The old term monopetalous will not answer for it is from the Greek *monos,* alone, and the word for petal. Sympetalous is somewhat nearer the mark for the first part of the word is the Greek *syn* meaning with, though this does not exactly express it. A closer approximation is embodied in gamopetalous, from the Greek *gamos* meaning a union or marriage, but none of the terms in use exactly indicates the situation. It may be noted, also, that gamophyllous and monophyllous are terms used to indicate the union of perianth segments. Polyphyllous, however, relates to leaves and not to flowers.

Brachysm in Maize.—When a plant is smaller than the normal in all its parts we call it a dwarf, but when only certain parts are dwarfed a new term is necessary. O. F. Cook who studied instances of this kind in cotton, suggested the term brachysm for such departures from the normal. Good illustrations of brachysm are found in the races of bush beans, dwarf peas, bush squashes, etc, where the internodes alone are shortened. A recent addition to this list is a brachytic form of maize which is less than a third as tall as the ordinary forms, but still sports as many leaves. This form originated as a hybrid between Algerian pop-corn and a Chinese waxy variety. The usefulness of such a form for the western regions of dry soil and high winds is apparent. In appearance the new form greatly resembles the Hopi corn so commonly cultivated by the pueblo indians of the southwest. This latter variety is so short that the ears are often halfburied in the sand in which the plant grows. The writer has seen full-sized ears on plants of this kind less than two feet high. Crosses between the Hopi corn and the new form did not give encouraging varieties, but crossed with normal forms some of the progeny were brachytic and these give promise of developing into useful strains. The form is discussed in Bulletin 925 of the United States Department of Agriculture.

A New Form of Dentaria.—About five years ago, Mr. B O. Wolden of Wallingford, Iowa, sent us living specimens of a curious form of toothwort (*Dentaria laciniata*) which had two sets of stem leaves instead of the usual single whorl. This year the form has fruited in our grounds and proves to be very much like the common form with the exception noted. This double set of stem leaves appears to be constant and since new species in this genus have been made on much smaller differences in leaves, it appears desirable to give this form at least a varietal name. It is here proposed to call it *Dentaria laciniata var. dichronum.* The root leaves and stem leaves are similar, those of the lower whorl being rather broader than in the common form. They are borne on petioles four inches or more long which arise from the stem about two inches from the ground. The second whorl of stem leaves is located midway betwen the lower leaves and the flower-cluster. They are on petioles about an inch long and similar in appearance to the lower leaves though somewhat smaller. those who prefer to call this a species would name it *Dentaria dichronum*, the specific name alluding to the two shades afforded by the two sets of leaves. The plant is reported to be fairly common about the type locality, Wallingford, Iowa.

Rhubarb Leaves Poisonous.—The common pie-plant or rhubarb (*Rheum rhaponticum*) of our gardens so universally used as the basis for pies and sauces in early spring is reported to contain a certain percentage of the deadly poisonous oxalic acid. It has long been assumed that this acid was present in the stalks along with malic and citric acids, but it does not occur here in quantities that makes it harmful. In the blades of the leaves, however, the acid is reported to be twice as abundant; in fact, it is sufficiently plentiful to make the use of the leaves a pot-herb decidedly dangerous. Numerous cases of poisoning have been reported from this cause. The poison is said to act by depriving the blood of its protecting calcium. In cooking, the acid may be neutralized by the addition of small quantities of calcium carbonate, that is, of ordinary limestone. It is likely that in regions where the water is "hard" it contains enough calcium carbonate to render any part of the plant harmless, but it is just as well to discard the leaf-blades. The leaf-stalks or petioles are never poisonous.

GOAT-WEED IN IDAHO—In the early '60's a hardy adventurer from New York State pushed his way westward toward the Oregon Trail. Finding the valley of the Snake River to his liking, he tarried a while and finally established a stock ranch in a fertile meadow where a little creek empties into the Blackfoot River. Having built a cabin he went back and brought his bride from the Catskills. She missed the familiar garden flowers of her childhood days and sent back for roots and seeds from her grandmother's garden. Many of these failed to grow in the new environment, but hollyhocks, mallows, ox-eye daisies, and the goatweed (*Aegopodium podagraria*) thrived and spread until the garden was a wonder in the wilderness. Later the Blackfoot Indians took the war-path and frightened away the ranchers, driving off the stock and burning the buildings. The buildings were never rebuilt and the wonderful garden soon disappeared, but the ox-eye daisies still bloom along the creek and the goatweed found refuge among the sage-brush where it can still be found. The original gardener still lives in a ranch up the valley and goes every June to pick "grandmother's border plant." This year one of the granddaughters sent me a fragment with a request for its name.—*Mrs. M. E. Soth, Pocatello, Idaho.*

Peloria in Violets—Everybody knows that in normal violet flowers, the lower petal is spurred. When peloric flowers occur this "irregular" flower may be made "regular" by each petal producing a spur. A writer in *Torreya* records a plant of *Viola primulaefolia* with flowers of this nature, which was found on the bank of a stream at West Raleigh, North Carolina, in 1912. This plant was removed to a more suitable location for study and has since formed a considerable colony all of which bear peloric flowers. Seeds from the original plant produced new plants with the characteristics of the parent, thus giving additional evidence that such plants may breed true and that a race of peloric plants may thus be established. A curious feature of the abnormal flowers is that they are mostly 4-parted instead of having five parts in a whorl as orthodox violets do. Many of the flowers, however, failed of complete peloria and there was noticed a considerable irregularity in the number of parts in a whorl.

The Arctic Tundra.—The polar margin of North American vegetation is characterized, as in other continents, by the treeless tundra. In Alaska the tundra occupies a narrow strip along the Bering Sea, and on the northern coast it covers the polar slopes of the northernmost branch of the Rocky Mountains. From the Mackenzie river eastward, its southern limit strikes inland across the lake region to reach Hudson Bay at Fort Churchill. The specific feature of the American tundra as compared with those of Siberia and Greenland is the wealth and extent of its lichen carpets. Though the ling heath is entirely absent from America, other species of the heather family are numerous, and in the tundra or barrens their dwarf bushes are preponderating. Among them occur evergreen *Rhododendron, Kalmia, Ledum,* bearberry and other bushes of a similar character, clad with lichens.

The well-known bloom-mats carpeting the southern slopes of many of the hills and knolls, like islands or oases of beauty, are said to reach their best development in Alaska.—*M. E. Hardy in "Geography of Plants."*

SURNAMES FROM PLANTS.—Time was when men had no surnames. When the crowd of Johns and Bills and Henrys became too numerous to be designated accurately by a single cognomen another was added which finally became the family name. People do not seem to have been very particular about their surnames and a stuly of the names they have assumed is full of interest. Of such names derived from plants we have Berry, Budd, Bush, Corne, Flower, Plant, Pollard, Rice, Root, Seed, Thorn, Wood, Ash, Broome, Brummel, Coling, Crabtree, Gale, Gribble, Hawthorn, Hawtree, Hay, Hollins, Holme, May, Oakes, Rose, Snoakes, Snooks, Rowan, Akers, Cherry, Crabbe, Coine, Fraser, Hague, Haigh, Merry, Boone, Bennett, Cockle, Cole, Couch, Darnell, Drew, Emery, Fern, Fitch, Grass, Heath, Lavender, Lever, Lilly, Moss, Oates, Ramsey, Reed, Rush, Spiers, Ware, Woodruff and Pettigrew. This list is probably far from complete and we would be glad to have our attention called to any we have missed.

POISONOUS LIMA BEANS.—A number of leguminous plants are possessed of poisonous properties and among them are certain varieties of the common lima or butter-bean (*Phaseolus lunatus*). Those most likely to be poisonous are forms known as Burma, Java, Rangon or Burmania beans. The varieties grown so extensively in California and elsewhere for food are harmless but others have a poisonous glucoside which by hydrolysis produces hydrocyanic acid. As usual the wild varieties are most poisonous.

HAWTHORN OR THORNAPPLE.—In a recent issue of The *American Botanist* you ask for data as to the use of the names "haw," "hawthorn," and "thorn-apple." Mr. Cooper says that thorn-apple is the name here, (New York), but that "haw" was used in southern Iowa, where he resided for a time. My own home is in Worcester, central Massachusetts. There, "thorn apple" is the only term in common use, I am positive. I might add that while, as a child in Worcester, I played with children of English families, and have since known English grown-ups, I cannot recollect hearing any of them use "hawthorn" except for the cultivated shrubs, just as the rest of us do.—*Arthur C. Nutt.* [This appears to strengthen the theory that in the Eastern States "thorn-apple" has the preference as the common name of *crataegus,* but that in the Middle West this is shortened to "haw." Further observations are requested.—Ed.]

Cauliflory in Red-bud.—It is rare, in northern regions, to find woody plants producing flowers from the old wood. Soon after the twigs are formed they are covered with a layer of protecting bark which ordinarily buries the underlying tissues so deep that flowering from them is out of the question, In tropical regions, however, especially in the rain forest, the trees do not need such thick bark and the production of flowers from the trunk and larger branches, or cauliflory, as it is called, is a common occurrence. The chocolate plant (*Theobroma cacao*) produces most of its flowers in this way. The only plant in northern regions with this habit sems to be the redbud (*Cercis canadensis*) which rivals the wild crab and dogwood in beauty during the blooming season. Immense numbers of pink pea-shaped flowers are borne on the twigs and branches, in some cases on branches at least six years old. All our other shrubs either produce flowers from the wood of the preceding year or from twigs that are not formed until after the growing season begins.

EDITORIAL

The delay in the appearance of this number has been occasioned by a strike of the printers in the office from which it is issued. At a time when all branches of industry find it imperative to reduce costs and increase output, the printers generally have attempted to shorten their hours of labor and advance their wages. Although we are not pecuniarily interested in the present controversy, having a contract made before the matter at issue came up, we are not in sympathy with the efforts of any group of workers to hold up the public simply because they happen to have the power to do so, and have been willing to wait in the expectation that this latest holdup will be defeated. We trust that our subscribers are of the same mind. The slacker policy prevalent in this country of reducing production and increasing wages may appear at first glance to be desirable as making more work and better incomes for everybody, but in the long run it can only result in harder times and the loss of desirable markets. Many printers are now paid more than $200 a month which fact alone shows why books and magazines are so expensive. The refusal of employing printers to co-operate in further advancing costs may cause a temporary inconvenience to readers, but it is time that printing prices took a downward turn and we believe that every move in this direction should be encouraged.

* * *

Farmers in many parts of our country are asking permission to take in part of the roadsides on the plea that much land is wasted on which they grow additional crops. To such people the birds, the wild-flowers, the sheltering trees, and the wild things that scurry from one thicket to another are not to be considered in comparison with another row of corn or a few more square yards of wheat or oats. A carefully barbered roadside bordered by a neat line of barbed wire fence is apparently their idea of perfection. There are others, however, who hold no such opinions. The traveller, whether on foot or by more rapid means of conveyance, regards the unkempt waysides with an indulgent eye and values them in direct proportion to their raggedness. The preservation of our roadsides in some semblance of their original condition is regarded of so much importance that the American Association for the Advancement of Science at the recent meeting in Chicago adopted a resolution giving support to the movement for the preservation of our unprotected wild life and protesting the clearing up of the roadsides. This movement should have the active support of all botanists and other lovers of nature.

* * *

Recent demands upon our stock of back numbers has brought it close to the vanishing point. There are only about 25 full sets left and seven more are complete from volume 1 to 22 inclusive. Volumes 23 to 27 are already out of print except in full sets. Those who have partial sets of the early numbers cannot hope to complete them, but those who have the later issues, may still have a full set if the early numbers are ordered soon. We have various odd volumes earlier than volume 22 with which we can fill sets while they last.

BOOKS AND WRITERS

A new "Dictionary of Scientific Terms" by J. F. and W. D. Henderson has been received from the D. Van Nostrand Company of New York. This work aims to define the technical terms relating to the sciences in general with which the reference to botany, zoology, physiology and anatamy. These terms, it may be said, are not those used in taxonomy nor yet those found in the ordinary dictionary but are the strictly technical terms relating to the sciences in general with which the scientist may be unfamiliar. In addition to being defined, each word is pronounced, its derivation given and the science to which it refers indicated. We note the use of a diacritical mark to indicate a variation, we assume, in the pronunciation of certain terms though no reference is made to it in the table of sound symbols employed. The book was made in England and naturally reflects the British viewpoint. Fertilization and pollination are not as carefully distinguished as they are in America and the spelling of various words is different as for instance *caespitose* where we write cespitose. Both ecology and oecology are given and rosaceous is defined but liliaceous is not. Halophytes are included but oxalophytes have been overlooked. Monocotyledons and dicotyledons are, of course, defiined.but the shortened forms monocotyl, dicot, etc. are not noticed. The derivation of the words appear to have been very carefully traced. In this connection it may be noted that one is not warranted in assuming that two different words are derived from the same root because they have a similar sound. The first part of the word triangular comes from the Greek *tria*, but the same syllable in triarticulate is from the Latin *tres*. The defects noted in the book are not such as to impair its usefulness and these will doubtless be corrected in succeeding editions A careful study of the volume is recommended to teachers. They will learn that in hybrid and hybridize the y has the sound of eye, that gamete is accented on the last syllable, and rhizome on the first and that both *megas* and *makros* may mean large in such words as marospore and megasporophyll. Dictionaries of this kind are not as yet common and it is likely that this volume will find a warm welcome. The price is $4.50 net.

Although called a "Geography of Plants" a recent book by A. S. Hardy would better be named "The Plants of Geography." Those who take up this book in the expectation of finding the distribution of any plant or group of plants given are due to be disappointed. The book is in fact, not so much an account of plant distribution as it is a description of the surface of the earth with a rather general account of the plants that inhabit each physiographic area. These areas, moreover, are described without much reference to a central theme so that the work fails to make a coherent series. The geographical training of the author is evident in the use of a multitude of terms that in themselves do not indicate whether they refer to mountains, lakes, plains or deserts. Frequently the terms used in discussing the vegetation will be equally unintelligible to the general reader as for example, catinga, garigue, nyika, selva restinga, taiga, scree, punyas, etc. One may, indeed, find in this book, whether a given part of the world is covered with forest, scrub, grassland or the like and in a general way what kind of plants occur, but it appears to be far from a geography of plants. The book is published in England by the Oxford University Press whose office on this side is at 35 West 32d St., New York. It is a 12mo.

"The Music of Wildflowers" is the title selected by John Vaughan, Canon of Winchester, for a collection of botanical papers reprinted from various British magazines. As might be expected from one of Canon Vaughan's eminence, the essays are not simply recitations of collecting experiences, but rise to the dignity of good literature in which even the general reader finds much of interest. In the first paper, which gives title to the book, and is based on the statement of Dr. Arnold of Rugby that "Wildflowers are my music," one discovers that many Englishmen, noted in very different walks of life, have been ardent botanists. The list includes Dr. Arnold, John Stuart Mill, the poet Clare, Matthew Arnold, Charles Kingsley, George Grabbe, Gray of the "Elegy," and Alfred Tennyson. Crabbe, in fact,wrote a work on botany but because the Vice-master of Trinity College could not tolerate the idea of "degrading the science of botany by treating it in a modern language" Crabbe threw it into the fire. A majority of the essays are concerned with the flora of Suffolk, the country of Gilbert White of "Selbourne" fame and of Izaak Walton the Angler. Two papers "On Selborne Common" and "Where Izaak Walton Died" place these worthies in a new light. Walton, in fact, died in the Cathedral Close at Winchester. As a general thing, English essays dealing with out-door subjects have more style and finish and more literary excellence, than we commonly find in American writings of like nature and the present volume is a good illustration of the fact. It is published by E. P. Dutton & Co., 681 Fifth Ave. N. Y.

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Vol. 27. No. 3 Whole Number 130

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AMERICAN BOTANIST

AUGUST, 1921

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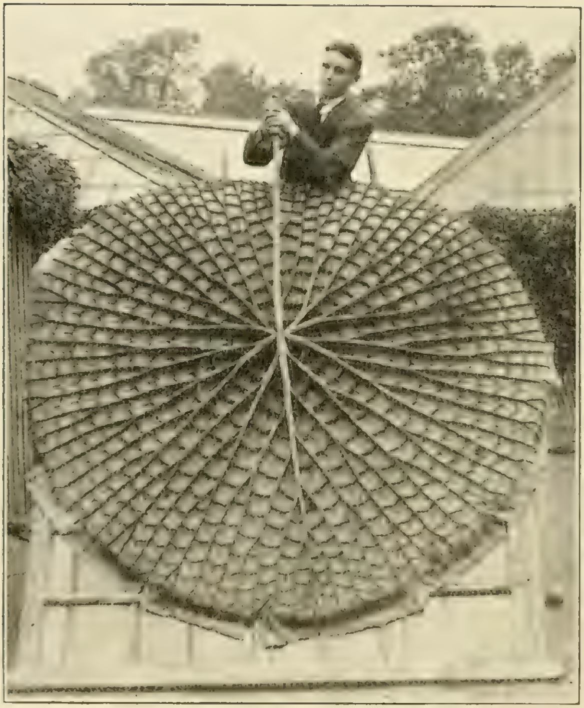


Leaf of Victoria Regia

THE AMERICAN BOTANIST

VOL. XXVII. AUGUST, 1921 No. 3.

I have a garden of prouder claims,
Full of novelties, bright and rare,
Modern flowers with stately names
Flaunt their wondrous beauty there;
Yet in threading its brilliant maze,
Oft my heart, with a homesick thrill
Whispers, dreaming of early days,
"Grandmother's garden was fairer still."
—Elizabeth Akers.

THE VICTORIA WATER LILY

BY WILLARD N. CLUTE.

THE greatest of all water lilies, *Victoria regia*, has been so frequently written about that the name at least is familiar to nearly everybody, but the plant, itself, is still so rare in cultivation as to present several unusual features. through the kindness of the Secretary of the Royal Botanic Society of London we are able to present as a frontispiece a photograph of the underside of one of the great leaves taken from a plant growing in the Society's garden. The following account is from the Society's *Quarterly Summary*:

"The *Victoria regia* in the gardens has done very well this year. It has had nine to twelve leaves of six or seven feet in diameter at one time and the plant has shown no signs of the disease which sometimes spoils the leaves.

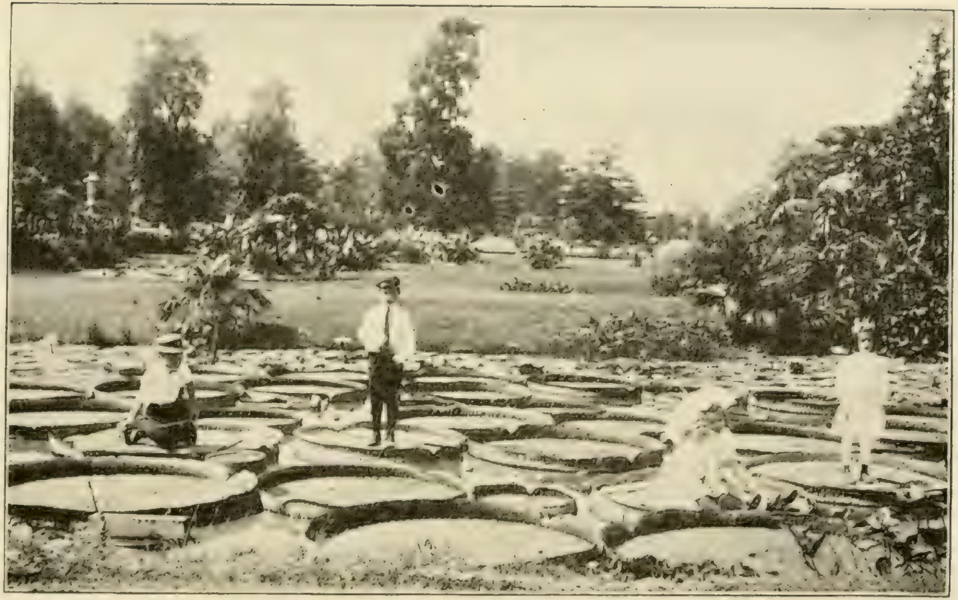
"The opportunity was taken when the tank was getting crowded, to cut and lift a leaf out intact and reverse it so as to show the underside. The upper side of the leaf has often been figured and most people are familiar with its appearance, but no illustrations that I can find have ever been made of the reverse side. The reason is the difficulty of lifting from the water and turning over so large a leaf—whose substance is no thicker than paper and besides is armed with needlelike spines—without breaking it. The photograph shows particularly well the unique mechanism whereby the leaf gets its extreme buoyancy and also the strength which enables it to keep rigid in so unstable a medium as water. It has been stated that Sir Joseph Paxton, the designer of the Crystal Palace, got his idea from the study of the structure of this leaf, with which, as gardener at Chatsworth—almost the first place the plant was grown after its introduction—he was of course well acquainted.

"Spruce the botanist who travelled in Central America in 1849 and saw the plant growing in its native waters said that 'the leaf when turned up suggested some strange fabric of cast-iron just taken out of the furnace; its color and the enormous ribs with which it is strengthened increased the similarity.' The ribs which radiate from center to circumference, though hollow have a depth of 4 to 5 inches at the center and with the septae divide the whole of the under surface into a series of chambers, air tight when the leaf is in the water. As the leaf exhales air through the stomata on the under side it is caught in these chambers, pushing the water down just as the contained air does in a diving bell. The air chambers give the leaf a buoyancy more than twenty times greater than it would have without them and as the leaf is able to increase or diminish the supply of air it follows that it can control its buoyancy. How great a weight a leaf can support was proved by the late Mr. W. Sowerby, who was Secretary at the time. Placing a sheet of zinc to cover the surface of the leaf, he poured sand upon it, distributing the weight equally, and it was not until 400 pounds, equivalent to the weight of three grown men had been deposited upon it, that the leaf sank.

"A most remarkable peculiarity about the under surface of the leaf is the way in which it is covered with long, sharp spines—some of them more than an inch in length. As the upper surface is without them it goes to show that whatever it is that it needs protection against, is something which attacks under water. It is scarcely likely to be fish for fish of the size to do damage would hardly live upon green stuff. But in its own river, the Amazon, we find an animal of the order Sirenia known as the Manati (*Manatus inunguis*) and this species, peculiar to the Amazon and its lagoons and tributaries, feeds exclusively upon aquatic plants from underneath the water. It is a seal-like animal 7 to 8 feet long with paddles for fore limbs and was once very common. It has a peculiar method of feeding; the long upper lip is slit vertically into two finger-like halves and these act as nippers, pinching off and pushing into the mouth the water plants on which it lives. The skin of the body is thick but that of the lips is thin and there can be little, doubt but that the plant evolved the spines to protect itself against the Manati or similar enemies with tender mouths."

To the foregoing account we add some notes on this species from *The American Botanist* for May 1917. Since the volume from which they are taken is now out of print they may prove worth reprinting.

Probably the most gigantic leaves in the world are those of the great water lily, *Victoria regia,* which grows in the quiet waters of northern Brazil and Guiana. Paul Marcoy an early traveller claims to have measured some that were more



The Giant Water-lily.—*Victoria regia*

than twenty-four feet in circumference. In temperate regions where the plant may be grown in warm pools, the leaves are much smaller but even then may reach a diameter of three or four feet. An interesting peculiarity about them is the fact that the edges are turned up for several inches all around, the leaves thus presenting the appearance of large shallow pans. The turned-up edges serve a practical purpose and keep the upper surface of the leaves from getting wet.

Although old leaves are so frequently pictured quite circular, the first leaves are narrow and elongated; the next are heart-shaped like ordinary water lily leaves and only the older ones are peltate with the petiole in the center. Even in the old leaves a distinct line shows where the lobes of the leaves have been joined. Leaves of this kind are strong enough to support the weight of good-sized children. In their tropical home the great leaves form an almost impassible barrier to navigation. Tropical birds are said to wander over them in large companies, searching for food.

The flowers, in keeping with the size of the leaves, are often more than four feet in circumference. Usually they are somewhat smaller, but blossoms with a diameter of a foot are common. The plant rarely flowers in the Temperate zone but may be induced to do so by keeping it at the proper temperature. It appears to have first flowered outside the tropics at Philadelphia. The blossoms are like those of the common water lily in shape. Outside they are a pure white, shading to a pink within.

The group to which *Victoria regia* belongs is not a large one, but it contains a number of interesting plants. The American lotus (*Nelumbium luteum*) has much in common with its relative of the Amazon. Like it the leaves are circular with the petiole in the center and the flowers are often as large as a quart bowl. The pink species so often cultivated in parks is the Egyptian lotus (*N. speciosum*) and is said to be the only other member of the genus.

The water lily family (Nymphaeaceae) has always been something of a puzzle to botanists. It is ordinarily regarded as Dicotyledonous but some, on account on the structure of the plant, favor transferring it to the Monocotyledons. In most books it holds a place low in the scale of classification being assigned to the Ranales which includes besides the type family Ranunculaceae, the Magnoliaceae, the Berberidaceae, the Calycanthaceae and several others. A more than passing resemblance may be found in the blossoms of the whole group. This is especially striking in the flowers of the peony, the mandrake, the magnolia and the calycanthus.

EARTH STARS

By Mary Earle Hardy

SOME one has said we may know the patterns which Nature likes best by noting those she uses most. Did you ever think how often the pattern of stars is repeated? Altho so often used, there is always diversity,—from the stars that twinkle in the sky to the star flowers of spring and summer, the asters of autumn, and the snowflakes of winter; beside the multitudes of other stars on land and even in the sea.

I wonder how many of you ever saw the interesting earth-stars or *Geasters* as science calls them. The books tell us that while they are not uncommon, they are only seen by the most observing and by them are but little understood. Earth-stars have been called "the most picturesque of the mushrooms." They are little glorified puff-balls, and are of especial interest to Nature-lovers because of their beauty and their singular habits. When growing they are fastened firmly in the earth by multitudes of fine thread-like growths known as the mycelium and look like the ordinary puff-balls, commonly known as "devil's, snuff-boxes." The little ball which holds the spores is covered by a double covering, the outer one thick and leathery,—the inner one fine as silk. In the fall the tough outer covering separates into star-like segments, and the seven or nine or even twenty rays turn back like the petals of a flower, lifting the plant from the ground. The silken pouch which looks most like a puffy little cushion, breaks open at the top and the earth-star starts upon its great adventure—traveling and sowing its spores.

It is a fair weather traveler, however, and chooses a bright day to begin its journeys. In fact, it only travels on bright days. At night, or during rains, or when the air is damp the prudent little earth-star spreads out its rays flat upon the ground; their underside becomes glutinous, holding firmly to the earth. So the prudent traveler camps and waits for fair weather. How did the wise little plant learn that dampness would hinder the sowing of its spores?

As soon as the air clears the star-like segments lift from the ground, their gelatinous lining hardens, and the stars give themselves again to the wind, which tumbles them this way and that, scattering and planting their multitude of spores.

There are many varieties of Earth-Stars or Geasters, and they range in size from the fraction of an inch to two or three inches in diameter. In color they are much like the sand or earth in which they grow and over which they are blown, and this accounts, in a measure, for their being so seldom seen; but those who know them admire them for their singular beauty and marvel at their life-story.

PLANT NAMES AND THEIR MEANINGS---VIII

LILIACEAE—III

By Willard N. Clute

THE fame of the lily-of-the-valley (*Convallaria majalis*) is so widespread that the plant is almost universally referred to by the name we here use. There are a few other names, however, that are scarcely appropriate and probably belong to that large class of book names that are rarely used except in print. "Mayflower" is not distinctive in a region where May is the flowery month and "May lily" is no better. "Wood lily" is more properly applied to the true lilies and "Conval lily" is merely an attempt to translate the generic name. In much the same way that chrysanthemums are known in the florists trade as "mums", the flowers of the present species are called "valleys."

Although the lily-of-the-valley is believed to be native to some parts of our country, its reputation for being a denizen of gardens is so fixed in the popular mind that other flowers are referred to as "wild lilies-of-the-valley." The one most commonly so named is *Mainthemum canadense*. This species has leaves very similar in appearance to those of the garden plant and its habit of growing in colonies adds to the resemblance. Although it normally bears two leaves, the generic name of *Unifolium*, sometimes given it, means "one-leaf" and the plant is also known as "one-blade". The fruits are tiny red berries and from this circumstance the plant is known late in the summer as "ruby bead." The term "cowslip" applied to the plant is meaningless and doubtless indicates a careless bibliographer. The relationship of *Maianthemum* to the group commonly known as "Solomon's seals" is obvious enough to gain for it the name of "two-leaved Solomon's seal" and this is probably its best known vernacular name. It was formerly included in the genus *Smilacina* which contain other plants named for Solomon and his seal. Upon the authority of its scientific name, this is the true May-flower but it appears to be rarely, if ever, so designated.

The true "Solomon's seals" belong to the genus *Polygonatum.* They derive their most familiar common names from the seal-like impressions on the root-stock left by the decay of the aerial stems. The name was first given to the European *Polygonatum multiflorum* at a time when a belief in the supernatural agency of many plant markings was strong. Our two species are often known as "sealworts." The Old World species is sometimes known as "David's harp" in allusion to an ancient musical instrument with a curved frame strung with bells. The "false Solomon's seals" have the same seal-like markings on their rootstocks, but they are less distinct, and since the flowers have separate perianth segments while those in *Polygonatum* are united, the "false Solomon's seals" are placed in the genus *Smilacina.* The commonest species (*S. racemosa*) is almost universally called "wild spikenard." It is not, however, very closely related to the plant reputed to be the real spikenard. "Golden seal" is doubtless due to some ignorant plant collector in whose ears all plant names ending in seal were one and the same thing. The name of "zig-zag Solomon's seal" refers to the arrangement of the leaves on the stem. The bright red berries have probably given the plant its common name of "Job's tears" though one of the grasses (*Coix lacryma-jobi*) seems to have the preference in this lachrymal contest if we may judge by the specific name. The "star-flowered" or "starry Solomon's seal" is the only other species to have a common name. It is also known as "false Solomon's seal." All the plants named "Solomon's seal" have the peculiarity when growing in colonies of bending their stems in the same direction, with a noticeable ladder-like arrangement of the leaves, but they seem to have escaped the appellation of "Jacob's ladder."

The plants of one lily-like genus are known as "bellworts" from their drooping yellow flowers. The most conspicuous is *Uvularia grandiflora*, with large pendant bells of pale yellow in which the perianth segments are more or less twisted. The names of "straw lily" and "straw flower" are not inappropriate. Another species, *U. sessilifolia,* is known as wild oats, the name probably referring to the color of the flower, though this or any other part of the plant has only the remotest resemblance to oats. The idea persists, however, for the same name is often bestowed upon *U. perfoliata* though this latter species is more frequently known as the "mealy bellwort" from the fact that the interior of the perianth is sprinkled with shining yellow grains. The name "straw bell" is appropriate enough but "Mohawk weed" is a puzzle. Possibly some early chronicler confused this species with a different plant used by the Indians. Members of the genera *Disporum* and *Streptopus* are often confused with these plants when not in bloom. Some of them, though fairly common, have no common names in the vernacular though they may have in the books. Species of both genera are sometimes called "twisted stalk" in allusion to the bent pedicels, and they also bear the name of "liver berry" though it is not clear whether the name refers to the fruits, which are not liver colored, or to some reputed medicinal virtue of the plants themselves.

Occupying much the same habitat as the bellworts are found two species of *Clintonia.* The name most frequently used for *Clintonia borealis* is simply "Clintonia", but others are sometimes heard, such as "wild lily-of-the-valley," the form of the plant suggenting the name. The slender flower stalk, rising from the rosette of rather broad, smooth leaves, accounts for such names as "cow tongue" and "bear tongue." "Heal-all" refers to its entirely mythical medical properties. This latter name is sometimes applied to an orchid with leaves of much the same shape and may have been transferred from that species. The name of "dog-berry" refers to the attractive, but inedible bluish-black fruits. The black fruits of *Clintonia umbellulata* have earned for it the name of "dog plum," the prefix, as ever, indicating worthless qualities. This latter species is often known as "white clintonia" to distinguish it from the more common species with yellow flowers. "Wild corn," applied to the white species, is unintelligible.

In old gardens and along roadsides to which it has escaped one may often come upon little colonies of the "star of Bethlehem" (*Ornithogalum umbellatum.*) It is a mystery why this plant is cultivated at all for the flowers are small, are green on the outside, have a short blooming season and remain open for only a part of the day. Perhaps its disposition to fend for itself explains its presence in many places where it is not especially desired. Insignificant as it is, however, its star-shaped flowers have become associated with the Nativity in its best known common name. It is also known as "star flower" and "summer snowflake." The fact that it closes at mid-day is echoed in such names as "nap-at-noon," "sleepy-Dick" and "ten-o'clock-lady."

The only lilywort in our flora to bear the name of hyacinth is *Camassia esculenta.* Among frontiersmen, however, this plant is more likely to be known as "camass" from the Indian term *quamass* applied to the edible bulbs. The "grape hyacinths" are by birth natives of Europe but they have become naturalized in some parts of our country. The commonest is *Muscari botryoides* whose specific name, as well as the customary common one, alludes to the clusters of tiny, roundish, almost closed bells like a cluster of grapes. From the flower, also, come such names as "blue-bells" and "blue-bottle." The flowers of *M. racemosa* are also known as "grape hyacinths", "starch hyacinth" and "pearls of Spain." It is probable that starch has been made from this plant as it has from so many other plants with underground storage organs. In connection with the last name it may be recalled that pearl was originally a term for an onion-bulb and this probably explains the vernacular name.

The species of yucca are the only lilyworts that share with the smilaxes the quality of being evergreen. When the plants are not known simply as "yuccas" they are usually called "Spanish dagger" or "Spanish bayonet" in allusion to the stiff leaves which in many species terminate in a point of needlelike sharpness. *Yucca baccata* has an edible fruit which the Indians of the Southwest call "hosh kawn." Some of the yuccas have long whitish filaments along the edges of the leaves which cause them to be known as "bear's thread," "Adam's needle," "Eve's darning needle" and "silk grass." Both *yucca glauca* and *Y. filamentosa* are called "bear grass" though so far as known bears have no connection with them. Perhaps the name was originally *bare* grass from its habit of growing in barren places. *Yucca glauca* is well called the "soap-weed" for the rootstock has only to be crushed to yield a fine substitute for soap. In certain ceremonies of the Indians it is always so used. This species is also known as "palmillo" or little palm though it has only a superficial resemblance to the palms.

Although the specific name of *Veratrum viride* signifies green it is comonly called "American white hellebore." The real "white hellebore" is a European plant but it may be said that neither species has anything in common with the true hellebore except the name. The latter is a member of the Ranunculaceae. Our plant is also called "green hellebore," "false hellebore" and "swamp hellebore" in reference to its poisonous properties and it is possible that "devil's bite" and "poor Annie" may belong to the same category. "Indian poke" and "poke-root" given to our plant are both applied to another poisonous species, *Phytolacca decandra,* which is not closely related to it. "Earth gall" may be still another reference to its harmful nature but "itch-weed" and "tickle-weed" are posers since in medical practice the drug is administered internally for its effect on the heart. Among the vernacular names for this plant in the books, we find "puppet root." This very nicely illustrates the carelessness of writers in cataloguing such names. In former days, the root of the Old World mandrake (*Mandragora*) was carved into the rude resemblance of a man (*puppet*) and used as a talisman to ward off disease. Ignorance or carelessness has first pased the name on to the hellebore and finally associated it with our plant.

Veratrum is not the only genus in the Liliaceae that is reputed to possess poisonous properties. *Amianthium muscaetoxicum* as its specific name suggests, is called "fly- poison," "crow poison" and "hellebore." *Stenanthium gramineum* is the "Death camass" and "hog potato," the latter name indicating undesirable properties. Several plants of the bunch-flower group are known as "false asphodels," notably

Tofieldia palustris and *T. glutinosa*. *Narthecium Americanum* is the "bog asphodel" while the specific name of *Xerophyllum asphodeloides* again refers to the name. Since nothing is definitely known about the asphodel of the poets it is as well to call these plants false asphodels as any. It may be added in passing that some assert that the original asphodel was the poet's narcissus (*Narcissus poeticus*) and that the common tongue has since changed asphodel first to "affodil" and then to "daffodil." The asphodel of the poets is always connected with death. It was reputed to grow on the confines of the infernal regions and was probably among the flowers let fall by Proserpine during her memorable encounter with Pluto. The bright yellow blossoms and grass-like leaves of *Narthecium Americanum* have given it the name of "yellow grass" while its fondness for moors accounts for "moor grass." "Rosa solis," applied to this species, seems to have no special significance, *Xerophyllum asphodeloides* is commonly known as "turkey-beard" from its feathery panicles of bloom.

One of the best known vernacular names of *Chamaenerium luteum* is "blazing star," though how this character can be read into the pale yellow blossoms is a mystery. The name of "drooping starwort" has reference to the nodding tips of the unopened raceme. After "blazing star," "Devil's bit" is perhaps the commonest common name. The reference is to the root which has the form known as premorse, that is, it appears as if bitten off. In the Old World the "scabious" (*Scabiosa*) is given this name. The legend is that the plant was one of marvellous medicinal properties residing largely in the root. Out of spite the devil is said to have bitten off the tip of the root to impair its healing properties. The names "Unicorn root" and "unicorn plant," doubtless refer to the root also.

The medicinal virtues of *Aletris farinosa,* albeit they are no longer acknowledged by the Pharmacopeia, have given it a number of names such as "colic root," "ague root," "ague grass," "bitter grass," "bitter plant" and "aloe root." The plant is called "stargrass" and "blazing star" with no more propriety than when these names were bestowed on *Chamaenerium.* "Unicorn root" and "unicorn horn" applied to this plant indicate a confussion of it with the preceding species. "Mealy starwort," however, is a name of its own and refers to the scurfy corollas.

FOSSIL PLANTS AND CLASSIFICATION

Henry S. Conard, Grinnell College

IN two papers published two years ago, the writer attempted to bring together several lines of botanical research into an outline of classification for it is our conviction that a true taxonomy must aim to embody the results and conclusions of all research in every field that has any bearing upon the problem of plant relationships or resemblances. The outline there presented and re-affirmed here is:

1. Thallophyta
2. Embryophyta
    1. Atracheata (Mosses)
    2. Tracheata
        1. Lycopsida (Lycopodiales Equisetales)
        2. Pteropsida
            1. Aspermae (Ferns)
            2. Gymnospermae
            3. Angiospermae

There are two objections to this scheme, namely, the greater convenience of the old system for thought and teaching, and the questionable validity of fossil evidence in the classification of living plants.

The first objection applies equally to all attempts to change from an outgrown or erroneous system to a new one. Those who are accustomed to any system, feel that it is more convenient for thought and teaching than any other. Additional years of experience convince me that the proposed new system is much easier and simpler for beginners than the old. I feel quite certain that this would prove true wherever this arrangement is tried.

The serious question is whether or not the fossil series can be drawn upon for light on the classification of living forms, or, to put it most baldly, whether fossil evidence can be used to break up what now appear to be homogeneous groups. In short, is our classification to be rigidly phylogenetic, or may it run crosswise of phylogeny whenever we believe a cross course is more convenient for thought and teaching?

If I understand the trend of thought, it is accepted that classifications should be, as far as our knowledge goes, phylogenetic. Presumably all who accept the doctrine of descent are striving toward this end. If so, then correct thinking and correct teaching must of necessity follow phylogenetic lines, whether it is convenient or not. And in the end, the correct way must be the convenient way.

There still remain however certain questions of the grouping of forms. An example will illustrate one of these. The bush lima bean originated about 1890 from three distinct climbing or "pole" limas:

Sieva bean gave Henderson's bush lima.

Potato lima gave Kumerle bush lima.

Flat lima gave Burpee's bush lima.

Shall we classify them as (1).

Phaseolus lunatus
  var. 1. Pole bean: Sieva, potato. flat.
  var. 2. Bush lima: Henderson's, Kumerle, Burpee's.

or (2).

Phaseolus lunatus
  var. 1. Sieva: pole and bush forms
  var. 2. Potato lima: pole and bush forms
  var. 3. Flat lima: pole and bush forms.

The phylogenist will surely choose the last. The case is plain, because the phylogeny is a part of recorded history. Freeman in the Standard Cyclopedia gives the following:

Phaseolus lunatus, Sieva or small lima bean
    Bush form: Henderson's.
  var. *macrocarpus*, Large lima bean
    Potato lima
      Bush form: Kumerle
    Flat lima
      Bush form: Burpee's

This may be written in diagram:

Phaseolus lunatus
  Sieva bean—Henderson's bush lima
  Large lima
    Potato lima—Kumerle bush lima
    Flat lima—Burpee's Bush lima

And yet I can imagine a botanist accepting and preferring the first scheme above, because it is easier to grasp and use for certain purposes. However, if classification is merely a convenient cataloging of things, then I am not much interested in it. If it is a summary of all knowledge, condensed into a logical series of catch-words, then it is worth the devotion of many lives.

The fossil evidence on plant origins presents a picture similar to that of the beans, but much more difficult. Had we a complete record of all the plants that have ever lived on the face of the earth, the evolutionist must believe that all sharp boundaries between orders and families and genera would melt away. Perhaps all species as we now know them would also grade insensibly into other species. There would remain at best such distinctions as between Jordan's Drabas or de Vries's Oenotheras. Perhaps we should be reduced to such gradations as those of the corn varieties bred in Illinois, or of Castle's hooded rats. What then would become of classification? Does that mean that the use of fossil evidence in classification must lead us more and more into a mist of uncertainty? Does it mean that there will be no families and orders and classes when our knowledge is complete, but only one uninterrupted and insensibly graded family tree?

By no means. Could we only know the details of the plant family tree, we could mark off the orders and families in a phylogenetic manner with a precision now quite impossible. Each line of descent would form a "natural" taxonomic group. And this, I believe, is the ideal for a synthetic system There will always remain, of course, the difficulty of assigning a place to a generalized form, a common parent of two or more lines of decent. And this is equally true whether we think of a parent as one individual or a group of similar individuals. Perhaps we shall have to develop a new kind of nomenclature for generalized forms, or a new nomenclature altogether. Once the problem is clearly seen, its solution can be confidently expected.

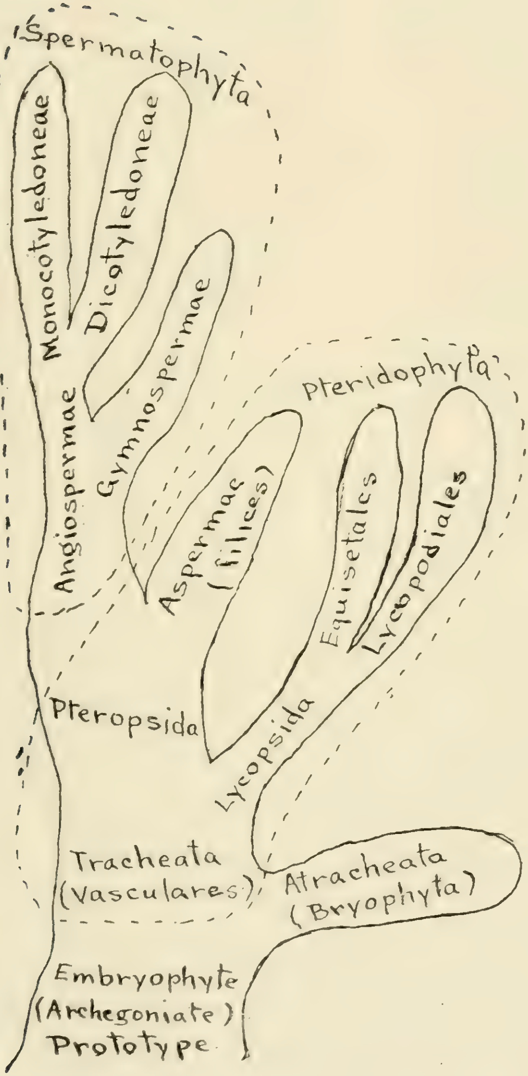


FIG. 1.—FAMILY TREE OF THE HIGHER PLANTS

It seems right therefore to conclude that a true classification must find its chief justification in its harmony with fossil evidence, as well as with all other kinds of evidence. One may even assert that no evidence is so unquestionably conclusive as is that drawn from fossils.

In applying these considerations to the old established group Pteridophyta, we find a curious jumbling of forms with superficial resemblances. There is ample reason to believe that the phylogeny of these groups runs somewhat along the lines of our figure.

There is of course some logic still in uniting all of the seedless Vasculares in one group, Pteridophyta, and the seed bearing forms in a separate and co-ordinate group Spermatophyta. But can these groups properly be called co-ordinate? Is not this to becloud the facts of anatomy and palaeontology?

No one familiar with fossil botany questions the intimate relation of ferns (Aspermae) and gymnosperms. We have had proposed the intermediate groups Cycadofilices and Pteridosperms. There is on the contrary no known connection between the Lycopsidan and Pteropsidan branches of Tracheate plants. This fact is just as cogent if we accept Scott's Sphenopsida as co-ordinate with Lycopsida and Pteropsida. The logical separation therefore occurs at this point of "unconformity." The basic division of Vasculares is into Lycopsidan and Pteropsidan (and perhaps Sphenopsidan) branches. In this case Pteridophyta and Spermatophyta no longer hold. D. H. Scott writes: "It will be noticed that this grouping crosses the customary division of Vasculares into Pteridophyta and Spermatophyta. Though the traditional classification will, no doubt, continue to be used on grounds of convenience, it no longer, in the light of the palaeontological evidence, expresses a natural arrangement, for the affinities between Pteridosperms and Ferns appear to be far closer than those between Ferns and any other Pteridophytic phylum." There remain three well co-ordinated groups of Pteropsidans:

Fern allies or Aspermae
Conifer allies or Gymnospermae
True flowers or Angiospermae

This is by no means original with the writer. It rests upon well known investigations. But it has not been sufficiently emphasized, and has not yet found its way into the common texts. It seems necessary therefore once more to call attention to the matter.

MIDSUMMER FLORA OF TUBA OASIS

(concluded)

Rhus triloba Nutt. SKUNK-BRUSH. This attractive shrub closely related to the Eastern *Rhus aromatica* is common in the oasis. The fruits are used by the Indians and the plant is locally known as "squaw-berry." 105

Sphaeralcea lobata Wooton. NIGGER-WEED. Common in dryish waste ground. Flowers like diminutive hollyhocks. 113

Sphaeralcea grossulariaefolia Hook & Arn. GLOBE MALLOW. Common in waste ground. 112

Epilobium Fendleri Hossack. WILLOW-HERB. Common along a rill north of Tuba. This appears to be somewhat out of its range. 109.

Oenothera ornata A. Nels. EVENING PRIMROSE. This plant, plentiful in the orchard at Tuba, has been referred to this species previously collected in Idaho. If the two are identical this is far beyond the credited range of the Idaho plant. The petals are so deeply emarginate as to make the flower seem 8-parted. The flowers open at dawn and close before midday. The moist spots in the desert are nearly always inhabited by species of primroses of many different forms which apparently are in need of more careful study. 102.

Anogra pallida (Lindl.) A species of evening primrose with white flowers that turn pink as the blossoms age, is very abundant in many places in the desert. The plant at Tuba was not collected but it is assumed to be this species.

Berula erecta (Huds.) An abundant umbellifer of no particular beauty in all wet grounds. 108.

Forestiera Arizonica (Gray). A curious shrub belonging to the olive family is common in various places about the oasis. This was originally described as a variety of *F. Neomexicana,* but Dr. Rydberg regards it of specific rank. It has seldom been collected. There is only a duplicate of the original type at the New York Botanical Garden. 118.

Centaureum Arizonicum (A. Gray). CENTUARY. This plant, with flowers like small pink sabbatias, was common in many moist places about the oasis. 58.

Apocynum cannabinum L. INDIAN HEMP. The Indian hemp is used by the Indians for various purposes and large thickets of it were found in many places where its growth is doubtless promoted. The specimens exhibit certain differences from the plant of the same name in the eastern part of the country. 87.

Dodecatheon sp? SHOOTING-STAR. Specimens which unmistakably belong to a species of *Dodecatheon* were found in fruit on a springy bank. They were not further identified.

Asclepias speciosa Torr. SHOWY MILKWEED. One of the finest plants of its genus, with large purplish flowers. Orchard at Tuba and elsewhere. 76.

Convolvulus arvensis L. BINDWEED. This familiar weed was abundant in the gardens at Tuba. 94.

Cuscuta arvensis Beyr. DODDER. Common on the borders of wet grounds, clinging to species of *Xanthium* or other weeds.

Gillia Gunnisoni Torr. This small species, with tiny whitish flowers was common in the driest adobe at Tuba. It was not seen elsewhere and through a desert plant, is thus included here.

Heliotropium spathulatum Rydb. A single colony in an abandoned field at Tuba. 96.

Verbena bracteosa Michx. VERVAIN. A common weed in gardens. 93.

Mentha Penardii (Brig.) MINT. This plant, with much the aspect of the field mint, (*M. arvensis*), to which it is near allied, was common at Reservoir Conyon. 88.

Lycium pallidum (Miers), TOMATILLA. A spiny shrub common in adobe soil. Flowers greenish, resembling those of its congener *L. vulgare*. Fruits pale red, reputed to be poisonous but used by the Indians after proper treatment. 4.

Androsera rostrata (Dunal.) BUFFALO-BUR. A single colony at the "sheep dip." Evidently introduced. 97.

Chamaesracha coronopus (Dunal). Abundant in cultivated areas. 78.

Datura meteloides D. C. DESERT TRUMPET FLOWER. Growing about the buildings at Tuba and in many places in the desert. Used by the Indians. 110.

Solanum triflorum Nutt. BLACK NIGHTSHADE. Common in cultivated ground. 126.

Mimulus guttatus DC. This northern form was found at Reservoir Canyon and seen later at Schultze's pass in the San

Francisco mountains at an altitude of 8,000 feet. The elevation of Reservoir Canyon is not over 3,500 feet and the species was quite unexpected here. 89.

Castilleja linariaefolia Benth. PAINTED-CUP. Common and wide-spread. 84.

Iva axillaris Pursh. An unattractive weed common in culvated soil. 117.

Chrysothamnus graveolens Nutt. RABBIT-BRUSH. Plentiful in good soil. Found in both flower and fruit. Used by the Indians in basketry. 120.

Solidago trinervata Green. GOLDENROD. The only species in flower though another species gave indications of blooming later. Both forms uncommon. 64.

Macheranthera parviflora A. Gray. An insignificant weed. in dryish soil. 134.

Gnaphalium palustre Nutt. CUDWEED. Common on the moist borders of a reservoir at Tuba. 124.

Helianthus petiolaris Nutt. This sunflower is very plentiful in the desert and the form at Tuba is likely that species. No specimens were collected.

Ximenesia encelioides Cav. CROWN-BEARD. An abundant composite in cultivated soil elsewhere. Has the aspect of *Helenium*. 104.

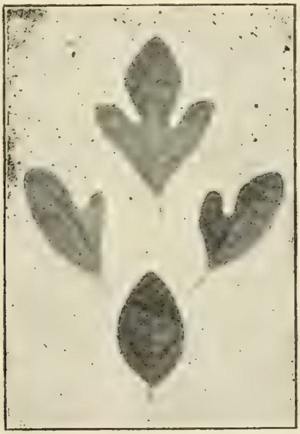
Cirsium calcáreum (Jones). THISTLE. Plentiful and very attractive to a large dark-colored species of humming-bird. 117.

Sonchus oleraceus L. SOW THISTLE. In cultivated grounds, common. 103.

THE SASSAFRAS

By Mrs. Viola F. Richards.

THE sassafras (*Sassafras officinale*) is found in North America from Canada, where it is only a bush, to Florida where it sometimes reaches a height of fifty feet. It has small greenish-yellow flowers which appear before the leaves and leaves which vary considerably in form as will be seen by the accompanying photograph which shows the upper side of four leaves picked from one small twig.



The wood of this plant is soft, light, and coarse with an agreeable smell and pungent, sweetish taste. The thick spongy bark of the root is used for medicinal purposes. It is a powerful stimulant, sudorific, and diuretic and is also used in skin diseases. The leaves contain so much muscilage that they are used for thickening soup.

An agreeable beverage is made by an infusion of sassafras bark or wood and a similar drink was at one time commonly sold in the streets of London under the name of Saloop.

NOTE *and* COMMENT

MONOCARPY.—With respect to flowering, plants fall into two distinct groups. In one, the flowers bear fruits only once and then die; in the other, they may fruit annually over a long term of years. Plants of the first group are known as monocarpic plants. The great majority of this latter group are of course, annuals or biennials, but others require a much longer time to complete their life cycle. The classic instance of this kind is found in the talipot palm (*Corypha*) which grows for forty years or more without a flower and after reaching a height of upwards of fifty feet sends up in a single season a flowering shoot nearly as tall as itself, after which the plant dies. There are a number of other plants whose *branches* fruit but once, among which are the Solomon's seal, the lily-of-the-valley and the peony, but in these the plant as a whole is a perennial and lives for many years. The so-called century plant and the yucca form a sort of connecting link between these two groups, for while the original plant dies after fruiting it does not do so until it has given rise to a number of new shoots which not only reproduce the old plant but also multiply it. In the *Journal of Botany*, G. R. Wieland names a number of other long term monocarpic plants including the Mauritius hemp (*Furcraea Americana*), several of the bamboos (*Bambusa*), and the climbing bamboo (*Chusquea abietifolia*). Another interesting species mentioned is the "pride of the mountain" (*Spathelia simplex*) which is native to Jamaica. This species reaches a height of fifty feet with a cluster of pinnate leaves three or four feet long at the top.

When mature, a terminal cluster of showy purple flowers rises above the leaves and by the time the fruits are ripe the plant has ceased to live. Nearly all the large monocarpic plants belong to the monocotyledons, but this last mentioned species is a dicot.

PEST VERSUS PEST.—It is with reluctance that we record anything in favor of the English sparrow but even the devil must be given his due, and we note here that one of the sparrow's favorite foods is dandelion seeds. On closely clipped lawns infested with dandelions he delights to discover the globular heads that have escaped the mower and seldom leaves them until the last seed has disappeared. However, he has begun the work of weed eradication too late. There will never be enough sparrows to eat up all the dandelion seeds.

FLOWERS THAT CHANGE COLOR.—Two lists of flowers that change color with age have appeared in recent numbers of this magazine but both missed the flowering currant (*Ribes aureum*). This fragrant shrub, so common in cultivation, has yellow flowers, but the yellow is the color of the sepals. The petals are much paler. After the flowers have been open for a short time, however, the petals become red and thus make a decided contrast with the septals which do not change.

ANT GARDENS.—Everybody has heard much about the sagacity of the ants; of their fondness for honey-dew secured from plant lice, of the habit of some species of keeping slaves, of their cultivating certain grasses for food, of their raising mushrooms in underground caverns upon spawning beds made by the ants, of their methods of storing honey in certain elderly females of the colony, of their association with plants which cater to their wants and of many other things that corroborate Solomon's good opinion of them. Fully as wonderful as any of the features mentioned are the ant gardens constructed by several varieties of South American ants, of which photographs are shown in a recent number of *Ecology*. In building the gardens, the ants select a suitable branch of a tree upon which they heap a considerable quantity of earth and humus. Upon these roundish structures certain plants begin to grow. Whether these are planted by the ants is not certain, but nearly always the same kind of plants are present and in any event their roots penetrating the mass hold it together while their aerial parts protect it from the torrential rains and thus form a home for the ants. Fourteen species of plants belonging to no less than six widely separated plant families have been collected from such ant gardens. Among them are cacti, peppers, and figs. The plants are so commonly associated with ant habitations that six separate species have *myrmecophilum* or *formicarum* for specific names.

THE CURIOUS DODDERS.—Twenty-six species of the genus *Cuscuta* are found in the United States and thirty-three in Mexico. All are parasitic, twining about other plants from which they take their food by means of sucking organs termed haustoria. All the species are commonly known as dodders. In a monograph of the genus by G. H. Yunker recently issued, there is much interesting information about them. Some are so slender that the stems measure only a tenth of a millimeter in diameter. Most of the species attack herbs, but a number prey upon woody plants. The flowers range from a millimeter to seven millimeters in length and in some species they are produced within the stem and burst forth at the time of blooming.

GIGANTIC BLACKBERRIES.—Probably the largest blackberries in the world have recently been discovered in Columbia. The best specimens measure two and a half inches long and an inch and a half through—nearly five inches in circumference. The fruit is light crimson in color and the flavor is said to resemble that of the logan-berry. It is said to possess more seeds and less juice than do ordinary blackberries from which it is apparent that its chief use to American growers will be for hybridizing with more palatable fruits in order to increase their size. The plant prefers a moist, cool climate but is reported to be somewhat tender and it is likely therefore to be useful only in parts of the West. In cross-section the fruit is inclined to be four or five-angled. Some question still exists as to the exact scientific name of the new fruit. It is much like forms of *Rubus macrocarpus* and *Rubus roseus* with considerable likelihood that it is the latter species.

FORMA VERSUS VARIETY.—What is the difference between a form and a variety? The average individual would reply that there is no difference worth mentioning, but the scientist can distinguish tweedledee from tweedledum with a large margin of safety, especially when such distinction give him a chance to make one of the "new combinations" so dear to the heart of the closet naturalist. A variety is a form differing from the normal, but the variety is by implication a rather more stable thing than the form. It is, however, rather amusing to find reputable botanists venturing a double author citation on the strength of calling a variety a form or the reverse. The botanical species has recently been roughly handled by the scientist who finds it to include elementary species, races, varieties, sub-varieties and a large number of geographical, ecological, physiological, seasonal and other forms. To dignify these small differences from the normal with a double author citation seems to many people unworthy the attention of a real scientist and gives reason for the suggestion that the "personal advertisement," as C. G. Lloyd so aptly expresses it, be omitted altogether.

COMMON NAMES FROM SURNAMES.—-In his recent Flora of Glacier National Park, Dr. Paul C. Standley tells us, in his note on *Thlaspi arvense,* that "in some parts of the Northwest the name 'Jim Hill weed,' is applied to the species, the ranchmen having associated its appearance with the building of the Great Northern Railroad." This name had not penetrated to the Dakotas and Minnesota when the writer last botanized in those States, the favorite name there being "Frenchweed" or "fanweed", while the European name of "penny cress" seems never to have reached the West. But the memory of the great empire-builder, the most virile and commanding figure in the development of the Northwest, has also been kept alive by the appellation of "Jim Hill mustard" bestowed upon the European "tumble mustard" (*Sisymbrium altissimum*) which began to appear in the Mississippi Valley about 1890, evidently coming from the westward, and which was at once associated in the public mind with the building of the new railroad and its great directing figure. Nothing could more vividly express the strength of the impression which James J. Hill left on his generation than this commemoration of his name in the case of these two weeds. On what other citizen of the republic has such a distinction been conferred? I can think of no other name that represents any actual personage of modern times. Mythology and sacred history have contributed to botanical nomenclature in such names as "Hercules' club," "Three-seeded mercury," Venus' comb," "Venus' looking-glass," "St. Andrew's cross," "St. John's wort," "St. Peter's wort"—and even our common parents have been remembered in the names "Adam and Eve" and "Adam's needle;" but while innumerable laymen as well as scientists have been immortalized in the *scientific* names of plants, rarely indeed has any human being so powerfully impressed his contemporaries as to be commemorated in a vernacular plant-name. One occasionally will find a name of this character current over a very limited area: for example, in many parts of Polk County, Oregon *Hypericum perforatum* is known as "Gwin-weed," from the person who is said to have unwittingly introduced this pest in nursery-packing; but such names are merely sporadic and local. All honor to the great pioneer of the Northwest, who deserves to be remembered by a far handsomer and less pestiferous plant than either of the two weeds which now bear his name—*J. C. Nelson.* [Prof. Nelson has overlooked the name "Ransted" often applied to the toad-flax (*Linaria vulgaris*) in allusion to the person who introduced it into the United States. "Joe-Pye-Weed" commemorates an Indian doctor who used the plant so named in medicine, and "Bowman's-root" is probably similarly derived. The well known "timothy" grass is said to derive its name from Timothy Hanson who introduced it into America about 1720, though W. Ellis, writing in 1750 calls this St. Timothy's grass. Additions to this list are desired.—Ed.]

Poison Ivy.—Everybody knows that poison ivy (*Rhus toxicodendron*) will produce a dermatitis, as the medical wights call it, when applied to the skin of susceptible individuals, but the question whether it can produce its well-known effects from a distance often comes up without a very satisfactory answer. James B. McNair, after a careful study of all parts of the plant, concludes that contact with the plant is necessary to cause poisoning. In an article published in the *American Journal of Botany,* he states that neither the anthers, the pollen, the epidermal hairs, the bark, nor the wood is poisonous but that the fresh sap undoubtedly is; in fact, that this is the only part of the plant that is dangerous. There exists a widespread belief, however, that people may be poisoned at a distance from the plant, the poisonous principle being supposed to be conveyed by the pollen or plant hairs. Not all people are susceptible to the poison, but those who are, usually give the plant a wide berth and still are poisoned. The smoke from burning poison ivy is also said to poison some people. The harmful principle is a resin. Possibly at certain seasons some emanation from this source may cause the intense itching and vesiculation characteristic of this affection.

YELLOW IRIS NATURALIZED.—Recently while driving I found an iris quite new to me. It was growing in low wet ground by the roadside and its one remaining flower was a bright soft yellow in color. The leaves were long—quite two feet or more—and narrow and bright green, lacking the soft bloom that many of our cultivated varieties possess. The flower, which had evidently passed its best days, was about the size of our common native species but with the inner divisions of the perianth very short, after the fashion of the Japanese iris. The only light I can find on the subject is a note in Gray's Botany saying that the yellow iris of European marshes "is reported as having become established in Mass. and N. Y." The flower is very attractive and if you can give me any information in regard to it, through the magazine, I shall be very glad. As much of it was being destroyed by the grading of the road I brought a clump home with a clear conscience. I wonder if hybrids of value could be grown from it.—*Adella Prescott, New Hartford, N. Y.* [The plant referred to is *Iris pseudacorus* a European species often offered in the catalogues of iris dealers. Like many other Old World plants it has a disposition to look out for itself and has escaped from cultivation in several places. It is good for naturalizing along streams and in wet places but the flowers are too small to make them desirable for cutting. It is likely that the plant may be of value for introducing a strain of yellow into the garden irises. Pure yellow flowers of this kind are still rare.—ED.]

FREAK DOGWOOD.—In the spring of 1920, I found a curious flowering dogwood. It was about twelve feet high and very thickly covered with flowers. Instead of the usual four broad bracts around each bunch of florets, however, there were two narrow ones. The whole tree was searched carefully for normal bracts and none were to be seen. I never saw so many berries on a dogwood as that tree displayed in the fall. In January the tree was visited again and I was not surprised to find only small and pointed buds foretelling that it would have nothing but leaves to show next summer.—*Nell McMurray, Clearfield, Pa.*

WANTED AND FOR SALE.—Dr. W. N. Steil, University of Wisconsin, Madison, Wis., is making a study of the antherida of some of the scale mosses and desires living specimens of *Riccardia pinguis, R. multifida* and *Pellia* from other localities for study. The Riccardias are tropical and subtropical plants belonging to the thallose Jungermanniales. They have a fleshy thallus usually with short lateral branches upon which the sex organs are borne. They grow in swamps and low grounds. Anyone who can collect specimens of these plants should communicate with Dr. Steil. Those who wish specimens of Rocky Mountain plants for their herbarium will be interested in knowing that Mrs. M. E. Soth, Pocatello, Idaho, has specimens for sale. These include a number of alpine specimens.

EDITORIAL

The subject of evolution has been so obfuscated by discussions of minor details that many people are in danger of regarding the whole matter as too deep for them. As a matter of fact, the principles of evolution are easily comprehended; it in only the working out of these principles that gives rise to doubts and differences of opinion. In a recent number of *Science*, Prof. C. C. Nutting points out that there are really only three main factors in evolution and that all three are capable of proof and are admitted by practically everybody. These three are (1) *heredity*, by which children tend to resemble their parents or at least the family line, (2) *individual variation*, which prevents any organism from being exactly like another, and (3) *geometrical ratio of increase*, by which each species tends to produce more individuals than can survive. Given these three and some kind of evolution is bound to occur. As to how it occurs scientists are not quite agreed. Darwin held that new species were in the main produced by the accumulation of small variations through considerable lapses of time, being helped thereto by the crowd of species, forms and individuals which made it possible for only the best fitted to survive. The Mutation Theory of DeVries distinguishes two forms of variation and intimates that only one of these results in new species. The first or *continuous variation* might be illustrated by mere size in individuals which tends to vary forever with the food supply and other conditions. The second or *dis-continuous variation* results in the "sports" which appear suddenly and do not thereafter return to the usual form. For a time it was held that all advances in evolution were due to discontinuous variation and the unlike forms which result from it, but the studies of many investigators have shown that discontinuous variation may produce small variations that are just as stable as large ones. That many new species have originated by mutation can scarcely be doubted but that other species fully as good have arisen through the small variations described by Darwin is equally certain. Continuous variation, could of course, originate nothing. It is only when such a variation swings so far in one direction that it cannot return that new species may result, but in such a case it is no longer a continuous variation. Any further variation must be around a new set of characters; that is, around a new species or variety.

BOOKS AND WRITERS

A second edition of John N. Martin's "Botany for Agricultural Students" being needed, the author has taken the opportunity to change its title to the more appropriate "Botany with Agricultural Applications." At the same time various errors in the text have been corrected, new matter has been added, additional illustrations provided and other illustrations improved. The book is now an octavo of more than 600 pages and 488 illustrations. The subject matter of the book is that of the usual textbook, but it differs from others in drawing its illustrative material chiefly from agricultural sources. It is issued by John Wiley & Sons, New York, and costs $3.50.

* * *

The author of a recent botanical work, published by himself, boasts in his advertising that he allows no discount to dealers. Apparently he expects the seller of books to work for nothing or for the glory of serving so eminent a man. As a matter of fact the bookseller has a living to make and depends upon bringing author and publisher together to do it. He knows of hundreds of possible purchasers for each work, but unless he is repaid for his time, trouble and for his investment in postage, advertising, catalogues, rent and the like, he will simply ignore the new volume, however meritorius it may be, and devote his efforts to selling books in which there is a profit for him. A number of botanists are fooling themselves into believing that they can sell as many copies of their books as can the experienced publisher. To advertise that no discount is allowed is simply to call attention to one's inexperience. In all phases of existence, it is better to play the game according to the rules. That is what the rules are for!

* * *

Sooner or later, each Commonwealth in our Nation arises to the patriotic duty of taking account of its trees. Indiana did this in 1911 by issuing ten thousand copies of "The Trees of Indiana," by Charles C. Deam. In less than three years the edition was exhausted and another of a thousand copies went the same way in five days. This induced Mr. Deam, who is State Forester, to plan a new and larger work and this has now appeared as a revised edition of the original volume, though the book has been entirely re-written. Indiana has been particularly fortunate in the selection of a Forester. Instead of sitting in his office and trying to imagine trees, Deam has gone out after them. Since the first edition of his book was published he has travelled more than 27,000 miles in the State by auto, visiting every county and nearly every township. He may be said to really know the trees though the Reviewer thinks he knows of one that he missed. This, however, appears to be a new species or variety and will be pointed out to the Forester in due time. In treatment the book follows the general run of tree-books. There are illustrations of the leaves, flowers, fruits and other parts, made from photographs of herbarium specimens, descriptions of the trees in untechnical language, a careful account of the distribution of each species, and various remarks concerning the uses of the wood, peculiarities of distribution, and similar matters. The perplexing genus *Crataegus* has been written up by W. W. Eggleston, an authority on the subject. The book has many points of interest and should be of value, not only to residents of the State but to students in the surrounding States as well.

* * *

The average man reacts to the sight of a new plant by first asking its name and then what it is good for. If the specimen happens to be an edible plant, he will be pretty sure to find an answer to his second question in Sturtevant's "Notes on Edible Plants" recently issued by the Department of Agriculture of New York State. The compiler of this list, the late Dr. E. L. Sturtevant was well known to an older generation as a man deeply read in the subject of economic botany, who had spent almost a lifetime in the study of useful plants. During his life he published many papers on the general subject, but his greatest work, a list of the food plants of the world with notes, was left unfinished and after the lapse of some twenty years has now been arranged and edited by Dr. U. P. Hedrick. This forms a quarto volume of nearly seven hundred pages. In it, the plants are arranged alphabetically by genera. The nomenclature is that of "Index Kewensis" and therefore for the most part free from the changes that have made the nomenclature of the last quarter century more or less of a joke. An examination of the book shows few if any important crop plants that are unknown to the general reader. The minor crops listed are apparently rarely capable of being developed into valuable additions to our farms and gardens. There is listed a large number of fruits, especially from the tropics, that have heretofore been practically unknown and a still greater number of plants that can be used as pot-herbs, teas, etc. These latter have been largely reported as being used by Indians and the natives of various uncivilized parts of the earth. Moreover, since it would be manifestly impossible to try out a hundredth part of the plants mentioned, a majority are reported on the frequently inaccurate observations of travellers. In this way the hard, bony seeds of the witch hazel are reported on the strength of a statement by Rafinesque, and the highly poisonous seeds of *Datura Metel* probably (*D. Meteloides*) are given a place. *Cyphomandra Hartwegi* from Granada is said to be used in Buenos Aires. It may be added that it is fairly common in Jamaica and has been shipped to the New York markets under the name of Jamaica goose-berry. Although a large number of the plants listed are only of nominal food value, their inclusion greatly enhances the value of the book. We now feel that we have a pretty complete list of the food plants of the world under recognized scientific names in a single volume. The notes for the most part are largely concerned with the parts of each species eaten, the treatment necessary to make them palatable, their flavor and other characters, and references to the other works from which this information was drawn. All the staple crops are treated at considerable length and their varieties discussed.

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ROCKY MOUNTAIN COLUMBINE—*Aquilegia Coerulea*

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THE AMERICAN BOTANIST

VOL. XXVII NOVEMBER, 1921 No. 4

In purple and gray-wrought lichen
The boulders lie in the sun;
Along the grassy footpath,
The white-tailed rabbits run.
The crickets work and chirrup
Through the still afternoon;
And the owl calls at twilight
Under the frosty moon.
—Bliss Carmen

OLD GARDEN FLOWERS

THE COLUMBINES

The gardening novice often fancies that the plants he cultivates are in certain specific ways different from the so called "wildflowers." It is of course true that garden flowers are in many cases greatly changed from the representatives of their race afield, but all good gardeners know that our garden flowers, or at least their progenitors, all grow wild somewhere. These undomesticated specimens frequently offer merely a basis upon which to build beauty; they become attractive only when the gardener has improved them. Single flowers of no particular grace of outline are all the better for doubling and small flowers are enhanced in value by an increase in size, but there are other flowers that need no aid from the cultivator. They are born with a beauty that is difficult to inprove upon. An increase in size, a change in color, or a greater profusion of flowers is all that the gardener can hope to accomplish. Theirs in a beauty of form and line that doubling only mars. It is to this latter group that the columbines belong.

The curious flowers of this group with their five petals turned to "spurs" or nectaries, are borne on slender pedicels and have an exceedingly light and airy appearance which is heightened by the much-divided leaves not so unlike the leaves of the maidenhair fern in form. The slender nectaries make the flowers attractive to butterflies and long tongued bees and probably have earned the plant its name of honeysuckle. The older and better-founded term is columbine from *columba* a dove in allusion to the hooked spurs of a common European species in which a vivid imagination may fancy a group of doves. The scientific appellation of the group is *Aquilegia.*

Although all columbines have spurs, there is considerable diversity in their size and shape. Some are scarcely longer than the sepals, while others are several times as long. The location and arrangement of these spurs or nectaries are plainly to secure cross-pollination of the flowers, but the bees often do not play fair and instead of exploring the nectaries as they should, bite through the tip and thus secure the sweets without performing any useful work in return.

The commonest columbine in cultivation is *Aquilegia vulgaris;* in fact, the specific name indicates as much. It is a native of Siberia and has long been cultivated in Europe where it has produced many forms that are now spread widely in the world. Though considered a garden plant in America, it has become a wilding again in some places. There are several other forms in Siberia, but the genus is not confined to the Old World. It circles the earth in the North Temperate Zone and the majority of the species are American. The latest monographer lists twenty-five species from our part of the world. All but one are Western.

The species of Eastern America is the wild red columbine (*Aquilegia Canadensis*). It takes readily to cultivation and thrives in a variety of soils. In the wild state it grows on rocks, in meadows and on wet banks. The best of the Western species is a fine blue-and-white form from the Rocky mountain region known as *Aquilegia coerulea*. It is the species chosen as the State flower of Colorado. In his Monograph E. B. Payson writes of it: "In the Canadian Zone, among the aspens, spruces, and firs, it is not uncommon to see a hillside meadow so completely covered with *A. coerulea* as to hide all other vegetation and to make it seem a fairyland of huge, dancing blue and white stars." This species is illustrated in our frontispiece from a photograph kindly lent by Mrs. M. E. Soth. A peculiarity of the flowers of this species is that they are not drooping as are those of the common species of Europe and Eastern America. This erect habit is not, however, restricted to this single species. Several of the Western species have it.

Aquilegia chrysantha is a yellow-flowered form with long spreading spurs that is often seen in cultivation and is scarcely less popular than the blue-flowered species. More than a dozen other kinds are cultivated but the majority are either forms of, or hybrids between, the species already mentioned. The plants mix readily and if one wishes to obtain pure seeds or to keep a particular strain from running out, the plants must be isolated from the others.

The columbines are perennials but some behave much like biennials and often disappear after the second year. The columbines seem midway between the true annuals and the ordinary perennials. Like annuals, however, they readily grow from seeds and in some cases come up with such spontaneity as to make them almost weeds. Seed production is a critical period in the life of any plant and many species do not survive it. Removing the seed-pods as soon as they form will probably aid in prolonging the life of desirable plants. In their native haunts the species favor rich soil in rocky places and in the garden are frequently planted in the rockery, though they do equally well in any good garden soil. Practically all the species are flowers of spring or early summer. Although the genus is so well known it is likely that there are a number of species still to be discovered.

WAYSIDE FLOWERS

By Adella Prescott

ONE of the pleasures that automobiles have brought to nature lovers who by reason of limited time or strength are unable to spend much time in the field, is an increased knowledge of the distribution of plants. Species that are scarce or even rare in one locality are sometimes quite plentiful a few miles distant. In the vicinity of my own home, the quaintly dignified turtle head (*Chelone grabra*), that lover of low grounds and watersides, is seldom found—so seldom that a little thrill of pleasures comes with the finding of a fine plant—but last summer I was surprised and delighted to find it bordering the ditches and filling the fence corners along a road only thirty miles distant and growing with a luxuriance I had never seen before.

Bouncing Bet would hardly be expected to cause a thrill under any circumstances but this same free-and-easy denizen of our roadsides gave me a vision of loveliness that rarer flowers might be glad to emulate. One day our road ran parallel to a railroad whose roadbed was fifteen or twenty feet above the level of the highway and for two or three miles the track was bordered with Bouncing Bet which swept down the sloping sides of the roadbed in drifts of faintly rosy bloom spreading over the levels below with a tenderness and grace hard to reconcile with my previous opinion of this somewhat coarse and ragged plant. Of course it was distance that lent enchantment, but the picture was one that will live long in my memory.

Wild iris was one of the things that I had seen only in scattered clumps until we drove beside a sluggish stream where for a long distance the swampy ground on each side was softly purple with blooming irises. Since then I have seen similar masses many times and it seems to me the most delightful of "color schemes" that we see along the road for in this vicinity, daisies, buttercups, and devil's paint-brush form a large proportion of our color pictures and none of these have the elusive charm and beauty of the iris.

Of course, besides these larger pictures that fill the eye, even when seen from a swiftly moving car, there are many glimpses of exquisite beauty such as the noisy little brook that came racing down a steep ravine with much fuss and pother quite ignoring the forget-me-nots growing thickly along its path in its eagerness to reach the sea, the tiny bulbous bladder ferns fringing a dripping cliff ledge, and the rhexias gleaming like jewels among the sand and moss besides a lake-shore road.

Automobiles are well known to have a large share of the depravity of inanimate things and for this reason, probably, punctures and blow-outs usually occur at the most barren and uninteresting places but one day the motor most obligingly died beside a springy meadow where ladies tresses grew thick among the stubble. The passenger waited very patiently that day for the necessary adjustments that later started us again on our way. Orchids, even the tiniest, always stir the blood a little and to find the dainty things in such abundance was a treat indeed.

When some genius invents a chauffeur who can be started and stopped—especially stopped—by pressing a button like other parts of the mechainsm, then in truth will the cup of nature lovers whose desires and ambitions far outrun their lagging feet, be filled with joy.

NOTES ON OREGON PLANTS

By R. V. Bradshaw.

During the past summer a peculiar water plant came under my observation. It was found growing on the rocks in the Willamette River not far from Eugene. During high water these rocks are submerged, but in the dry season they project far out of the stream. The plant is unable to flourish out of the water, for as the water goes down it is killed by the hot sun and drought. In appearance it suggests a moss, but the branches are filiform, stiff and have no leaves. They are bright green and present a rather jointed effect, the joints being a darker green than the other parts. They are tufted and issue from the base directly and do not branch further. Besides these, at the base also arise little bladder-like organs which are open at the top and resemble a small empty caddis-fly case. These bladders were about 5mm. long and were about 2mm. wide. The tufted branches were nearly 7mm. long. This interesting plant was determined by Dr. Howe of the New York Botanical Garden, who calls it *Lemanea fucina rigida.* It is one of the few red algae that inhabit fresh water.

Attention was called in the February, 1920, issue of the

Botanist to the collection of *Cynosurus echinatus* (the dog's tail grass) at Eugene. Since that article was written this species has been found also about a mile north of Eugene on the Pacific Highway and at Fall Creek which is about seventeen miles southeast of Eugene. In both places this grass was abundant. At the first station it had crowded out everything else and presented nearly a pure growth; this was near a road and part of the stand had been cut. At the second station, a hillside overlooking a railroad, it was not so abundent.

Anthriscus anthriscus, a member of the parsley family, is another of the rare introduced plants of Oregon. I have collected but one specimen; it was at Eugene near the railroad. I think it has been collected probably once before in the state. This plant resembles *Conium maculatum* or the poison hemlock. The fruit however is beaked and bristly.

Cogswellia microcarpa, one of the dog fennels, which is not included in Piper and Beattie and which Howell mentions only from the Umpqua Valley on dry cliffs was brought in to me from the rocky hills between Eugene and Fall Creek. This plant looks not very much unlike *C. utriculata* which is so common about Eugene. Both have brilliant yellow flowers and beautiful green dissected leaves. These are members of the earliest spring flora.

The shepherd's needle (*Scandix pecten-veneris*)has been found in a few places in Oregon. This is another of the introduced weeds. But one specimen has been observed at Eugene and the following summer it was not to be found. This plant looks somewhat like a cross between an umbelliferous plant and *Erodium cicutarium* if such a creation were possible. The flowers are white and the fruit certainly does at a casual glance resemble that of an *Erodium.*

The cardinal monkey flower(*Mimulus cardinalis*) which is more to be expected in Southern Oregon is sometimes collected in sandy places along the Willamette River near Eugene. I have seen three specimens in two succesive years. Piper and Bettie's *Flora of the Northwest Coast* says of it: "In moist places, western Oregon, in the Umpqua Valley; perhaps not in our limits." I consider these of my collections to be merely strays, yet there is no real reason why they might not be permanent about Eugene, for those that I saw were flourishing.

One fall while walking on the north shore of the Willamette nearly a mile and a half from Eugene, I came upon a shrubby plant among a scattered growth of buck-brush (*Ceanothus cuneatus*) which I had never seen before. The dried capsules at once suggested the figwort family. The following summer I got the plant in bloom and was enabled to determine it. It was one of the pale yellow flowered *Pentstemons* (*P. deustus*). It was decidedly out of its locality, for Howell gives the distribution: "On gravelly banks in the dry interior region, Brit. Columbia to California, Nevada and Montana." The first part of this, "gravely banks" aptly describes the habitat at Eugene. But this illustration only goes to show how little is known regarding distribution in a place like Oregon where botanists are indeed few.

PLANT NAMES AND THEIR MEANINGS---IX

LEGUMINOSAE—I

By Willard N. Clute.

That great group of plants characterized by flowers like the sweet pea and fruits in the shape of pods has had more than the usual share of changes in name. To the farmer the plants will probably always be "legumes" and the family to which they belong the Leguminosae. This is the oldest and best known title. It is derived from the Latin word which means to gather by hand. Apparently the plants of this group have been known as useful plants from the most ancient times. Another old term for the group is Papilionaceae from the latin *papilio* meaning a butterfly. This, referring to the shape of the flower, appears to be quite descriptive, but the modern idea that the family name should always be made from some type genus suggests that these names should be displaced either by Fabaceae from the bean genus (*Faba*) or Phaseolaceae from *Phascolus* still another bean genus. It is futher to be expected in a family as large as this, containing nearly fifteen thousand species, that there will be various sub-divisions and these may themselves be considered good families by radical botanists. Thus we often find some of the plants ordinarily considered as Leguminosae in groups known as Mimosaceae and Caesalpineaceae. These latter, it may be observed are least like the species still considered to be in good standing in the Leguminosae. In the vernacular the members of the group are sometimes spoken of as "pulses", though this word is rarely used in America. Pulse is a very old term for a sort of soup made from peas, beans etc., and the word poultice seems to have had a similar origin.

Generic names in the Leguminosae have frequently been given in honor of botanists. Such names are commnly of less interest than names referring to plant characteristics though they frequently have a historical bearing on the subject. The genus*Albizzia* was dedicated to a noble Italian family which is said to have introduced plants of this genus into Europe. *Lespedeza* commemorates a certain Spanish Lespedez who was governor of Florida about the time of the botanist Michaux and *Robinia* honors John and Vespaian Robin, two Frenchmen father and son, who were first to cultivate our *Robinias* in the old world. John Robin was herbalist to Henry IV. *Schrankia* is named for Franz von Schrank and Zorma for Johann Zorn both German Botanists. *Dalea* is for an Englishman, Samuel (or Thomas) Dale who flourished in the 17th century and *Vigna* is for Dominic Vigna an Italian scientist. As a matter of interest it may be added that *Cicer,* the name of the European chick pea seems to have given origin to the family name of Cicero while *Faba*, the name of the bean genus is supposed to have given the patronymic to the famous Roman general, Fabius.

Among American botanists immortalized by genera of Leguminosae are Thomas Morong (*Morongia*), Dr. David Hosack, professor of botany at Columbia College and owner of an early botanical garden (*Hosackia*), Prof. Casper Wistar a distinguished anatomist of Philadelphia who spelled his name with an *a* though the genus is known as *Wisteria.* A similar liberty has been taken with the name of J. G. Gleditsch a German botanist of the time of Linnaeus in the naming of a genus which is now written *Gleditsia.*

The group of plants under discussion, having been known from the earliest times, has many genus names whose origins are lost in the mists of antiquity. In such cases, conjecture often takes the place of knowledge and leads to suggestions that may or may not be correct. *Acacia* said by Gray to be the name of an Egytian species, but Wood derives it from *akaso* meaning " to sharpen" in allusion to its spines, while Britton says the name means a point or thorn. According to Gray, *Cassia* is another name of uncertain derivation, but Wood, who is usually more discriminating in such things says it is from the Hebrew *Katzioth*. *Cercis* is said by one authority to be the name of the oriental Judas tree which indicates nothing. Another, and probably the correct derivation, is from *Kerkis* a weaver's shuttle in allusion to its pods. *Sophora* is the ancient name of a plant allied to our present species, according to Linnaeus, and Britton adds that it is from the Arabic for yellow. The present writer, not being familiar enough with the ancient languages to have an opinion, presents these suggestions for what they are worth. *Arachis* (from *aracos*),and *Ulex* are ancient names used by Pliny. *Cytissus* is supposed to be an early Roman name for a plant which this one resembles, *Anthyllis* is an old name used by Disoscorides, *Lathyrus* is the name of a Grecian plant mentioned by Theophrastus, *Lotus* is a name from the ancient Greek, and *Astragalus,* taken from the same tongue, denotes some unknown member of the Leguminosae. *Sesbania* is the Latinized form of *sesban* reputed to be of Arabic origin.

Of generic names derived from some characteristic of the flower, we have *Stylosanthes* from two Greek words meaning style or column, and flower, *Centrosema* from *kentron* a spur in allusion to the corolla, *Oxytropsis* from words meaning sharp and keel, and *Petalostemum,* more properly spelled *Petalostemon,* in allusion to the united petals and stamens in this genus. *Amorpha* means deformed or without shape as the flowers appear to be because of the absence of four petals. *Desmanthus* comes from words meaning bundle and flower in allusion to the numerous stamens. *Coronilla* means a little crown either because the flowers were used in garlands or because they are arranged in crown-like circles. *Hedysarum* comes from *edos* "sweet", and *aroma* "smell" and *Rynchosia* is from a word meaning beak and refers to the shape of the keel formed by the two lower petals of the flower. *Strophostyles* is formed from words meaning turning and style or column, and alludes to the form of the pistil.

The most interesting plant names are naturally those which are suggested by some peculiarity of the plant, thus *Aeschynomene* is variously translated as "being ashamed" or "to be modest" because the leaves of the species in this genus close when touched. The species of *Mimosa* have the same habit and the name is derived from *mimos* "a buffoon" because, as Wood suggests "the leaves seem sporting with the hand that touches them". *Lupinus* is from *lupus* a wolf "because the plants were thought to devour the soil". In reality the lupines not only thrive in poor soil but actually enrich it, a fact which is now widely appreciated. The inflated dry pods in which the seeds rattle has suggested the generic name for *Crotalaria* from *krotalon* a rattle. The rattlesnake genus *Crotalus* has the same origin. *Genista* is said to be the Celtic *gen* a bush. The name might originally have been applied to any small bush but *genista* is so much *the* bush in certain regions as to have usurped the title. A line of English kings, the Plantagents, is reputed to have been named for this *planta genista.*

Baptisia is from the Greek *bapto* meaning to dye and was given to this genus of plants because some species yield a poor grade of indigo. From the same word comes baptize which instead of dyeing ought to leave the candidate whiter than before! The woad is a British species of *Baptisia* with which the ancient Britons dyed their bodies green. *Thermopsis* is said to be formed of *thermos,* a lupine, and *opsis* like. *Medicago* is the name of the alfalfa genus and is said to be so named because the plant came to Greece from Medea. *Psoralea* is from a word meaning scurfy in allusion to the glands or dots on the leaves while *Tephrosia* is from *tephros,* ash colored or hoary. The genus is sometimes called *Cracca,* the latin name for vetches. *Glycerrhiza* is from *glycos* sweet and *rhiza* root, a most appropriate name for the licorice. *Phaseolus* is said to be the ancient name of the kidney bean and Wood says it means a little boat in allusion to the shape of the pods. *Desmodium* is from *desmos* a bond or chain and is said to have been given in reference to the jointed pods though the way these pods cling to one's clothing also suggests a bond. *Amphicarpaea* means "both fruits or all fruits" because the plants have two kinds of flowers and fruits, one above and one beneath the soil. *Dolichos* means long. It was formerly the name of some unknown legume and is now applied to the genus which bears it in reference to the pods. *Galactea* is from a word meaning milk. Some species were reputed to have a milky juice, but this is doubtful, as Gray suggests.

The genus *Apios,* is from a word for pear (Gray spells it pair), probably on account of the shape of the tubers. The word *Glycine,* by which the genus is sometimes known, is from the Greek for sweet and apparently not very appropriate. *Gymnocladus* is from *gymnos,* naked and *klados,* branch, in allusion to the stout branches with leaves only near the tips which thus appear to be naked. The same word for branch, and a word for brittle, forms *Cladrastis.* The clover genus, *Trifolium,* scarcely needs definition as most readers will recognize the words three and leaf in the name. *Melilotus* the sweet clover genus is from *mel,* honey and the ancient name lotus. *Parosela,* by which the species of *Dalea* are sometimes known is an anogram of *Psoralea.* Various other names have been given to certain of the genera in this family, but all within our limits that are recognized by the International Code are included in the foregoing notes.

AN EXCURSION IN THE SAN GABRIELS

By George L. Moxley

Having an extra holiday because the Forth of July came on Monday this year, Mr. Robert Kessler and the writer determined on a trip farther back into the San Gabriel Range than we had before had time for. By trolley and auto stage we went by way of Pasadena; up the Arroyo Seco Canyon and then walked about four and a half miles to Switzer's Camp where we spent the night. Early Sunday morning we started for Pine Flats, via Barley Flats, a distance, according to signs posted along the way, of about seventen and a half miles, but to one walking over mountain trails apparently a half more. Monday the return journey was made by way of the Trail Fork Canyon, the West Fork of the San Gabriel River, around San Gabriel Peak, Mt. Markham and Mt. Lowe, to Alpine Tavern, where we took the trolley for Los Angeles.

In the lower Arroyo Seco the canyon sides are covered with the usual chaparral of chamiso, or greasewood (*Adenostoma fasciculatum*), not the greasewood of the plains but a member of the Rose family, having small linear fascicled leaves and small white flowers in rather large panicled racemes; wild buckwheat (*Eriogonum fasciculatum foliolosum*), which also has small fascicled leaves and whitish flowers in terminal cymose umbels; scrub oak (*Quercus dumosa*) and other shrubby growth. The canyon floor is shaded by alder (*Alnus rhombifolia*), live oak (*Quercus agrifolia*), sycamore (*Platanus racemosa*) and occasionally other trees. The flowers that claimed our notice as we passed along were *Godetia Dudleyana,* now in full flower and making a fine show of pink flecked with purple; wild Canterbury bells (*Phacelia Whitlavia*), with their deep blue bells; large-flowered phacelia (*P. grandiflora*) with its white to lavender rotate corollas; *Antirrhinum glandulosum,* with its tall spikes of rose colored flowers; *Gilia Grinnelli,* a slender plant with loosely few-flowered branches, the corollas somewhat lilac in color with a purple tube; sticky monkey flower (*Diplacus longiflorus*) with tubular-funnelform flowers, the upper lip two-lobed and the lower three-lobed more or less crenately toothed; and the tree poppy (*Dendromecon rigidum*). Occasionally we saw *Lilium Humboltii* but the full glory of this magnificent lily is only to be found at higher elevations and especially where it is more unusual for excursionists to come. The reason for this is obvious. It grows in loose rich soil, never in bogs or wet places. The stems are often more than four feet high and sometimes bear forty to fifty flowers. the segments of which are two or more inches long strongly revolute and reflexed, reddish-orange with maroon spots.

The upper part of the Arroyo Seco runs approximately east and west and meets the upper end of the West Fork of the San Gabriel at a "saddle" almost directly back of San Gabriel Peak. The chief trees of this portion of the Arroyo are canyon oak (*Quercus chrysolepis*), laurel bay (*Umbel-*

lularia californica), a fair sized tree with lanceolate leaves having the characteristic bay odor and flavor, and broad-leaved maple (*Acer macrophyllum*). The big cone spruce (*Pseudtsuga macrocarpa*) is found in suitable situations on the canyon sides. The more showy flowers found along here were the so-called scarlet honeysuckle (*Pentstemon cordifolius*), with scandent stems, cordate leaves and scarlet tubular flowers. It is usually found below 3000 feet and replaced above that elevation by *P. ternatus* which has much the same sort of flower but the leaves are lanceolate and in whorls of three. *Lilium Humboltii* was here in fine condition some of the stalks being at least five feet high and having 40 or more flowers and buds. On the dry ridges was *Calochortus Weedii purpurascens,* one of our finest Mariposa tulips. The sepals are narrow and long-acuminate, the petals cuneate-obovate, purplish splotched with brown and densely hairy within.

From the above mentioned saddle, the trail winds in a continuously upward but not difficult grade to Barley Flats. Along this trail we found a very fine specimen of broom rape (*Orobanche tuberosa*)having a dense purplish bloom throughout. This is parasitic on *Adenostoma,* has a bulbous base, fleshy stem and is often branched at the inflorescence. The flowers are rather tubular, somewhat bilabiate, yellowish to purplish. Most of the specimens observed were past blooming, dry and more or less insect eaten. Along the upper portion of this trail we found some of the most striking specimens of *Diplacus longiflorus* we had seen anywhere. The clumps were often one and a half feet in diameter and the colors ranged from a creamy white to a salmon buff. Frequently a clump of the lightest color would be alongside one of the very dark making a very effective contrast. At about 5300 feet the trail passes over another saddle to the north side of a rounded summit which is a little less than 5600 ft. elevation. On this north slope we found some very fine specimens of *Heuchera elegans.* This little alum-root grew at the base of rocks and trees. It has a thick rootstock, roundish-cordate basal leaves and cymosely branched panicles of small flowers with pink calyx and white petals. Here also were many magnificent clumps of *Pentstemon Palmeri,* some of them nearly three feet in diameter and two feet high. The large creamy lavender flowers made a very fine show. Almost equally fine was the display of *Nama Parryi,* some of the stalks of which were five or more feet high and carried spikes nearly two feet long of purplish funnelform flowers.

Coming out on Barley Flats, which is an open rolling ridge, having a general elevation of about 5500 ft., covered with grasses and forested with big cone pine (*Pinus Coulteri*), we found various patches of color. Portions were quite white with *Linanthus androsaceus,* a slender plant with palmately linear-lobed leaves and salver-shaped flowers with a very slender tube and oval lobes. The flowers vary from white to pinkish. Other parts were deep orange with *Chaenactis glabriuscula,* while scattered all about were clumps of *Lupinus Hallii,* plants of *Calochortus invenustus montanus* with pale lavender flowers, and mats of *Eriogonum Kennedyi* (?) . This last was not yet in flower, which accounts for the slight uncertainty in its determination, but its interest for this trip lay in its being the host of several plants of the slender broom-rape (*Thalesia fasciulata*). Many smaller and less massed flowers were scattered all about, although the season was rather late.

Leaving Barley Flats the trail took an eastward trend and we travelled about five miles along a dry ridge having very little of especial interest. About the only color to relieve the monotonous gray-green of the chaparral, which is here composed largely of a manzanita (*Arctostaphylos tomentosa*), was an occasional clump of woolly blue curls (*Trichostema lanatum*), the Romero of the early Spanish settlers, and more of the *Diplacus* we have before mentioned. We now decended to a nice little stream bordered with willows and grasses where we found the Dogbane (*Apocynum cannabinum*) quite common. Here we also collected some fine spikes of false lady slipper (*Epipactis giganteum*). "The casual observer alludes to this plant as a 'Lady's slipper', and he is not so very far wrong, for it is closely related to the *Cypripedium*, and resembles it much in habit, in the aspect of its leafy stems and in the general form of its blossom. But instead of having its lip in the form of a sac, it is open and curiously jointed, the lower portion swinging freely, as upon a hinge. When this lid is raised, one can fancy some winged seraph or angel enshrined within, but when lowered the resemblance is more of a monk bowed in meditation. * * * Dull purples and greens predominate, though the lip is tinged with orange or yellow."

From this crossing it was a hard, dry, hot, sandy climb to Pine Flats, which is much like Barley Flats in general appearance and about the same elevation, but the forest is of yellow pines (*P. ponderosa* and *P. Jeffreyi*). Two very common plants on the rolling ridges were *Balsamorrhiza deltoidea* and *Lupinus Grayi*. We found a few belated snow plants (*Sarcodes sanguinea*) under the pines. This saprophytic ericaceous plant is very striking with its reddish fleshy, scaly spike and deep red companulate flowers. Some plants that were of considerable interest to us, in that we had not previously collected them, were the St. John's-wort (*Hypericum formosum*), *Pentstemon labrosus* and *Calochortus paludosus* (?). This last grew along the stream and in moist meadows which seemed to us very unusual places to find *Calochortus.*

On the return trip from Pine Flats to the ridge we had traversed the day before we collected *Oxytheca trilobata,* a polygonaceous plant with spiny bracts and three-lobed white petals, *Orobanche tuberosa* and *Hulsea vestita.* Reaching the top of this ridge we turned south into the Trail Fork of the San Gabriel, otherwise known as "Shortcut Canyon", where the vegetation was much like that of the upper Arroyo Seco. At one point we noticed a patch of *Epipactis* perhaps two or three square feet in area in which were eighteen fine spikes. The display of *Lilium Humboltii* in this canyon was also very fine.

Coming out of the West Fork we found ourselves farther from the trolley than we had anticipated with four miles of hot sandy trail to be traversed before climbing out of the canyon for another five miles of ups and downs, principally ups, so we did not try to make any further collections. Some plants of *Zauschneria* in flower were noted, however, rather earlier than is usual for this handsome scarlet fuchsia-like flower to appear. It was not collected but we noticed in passing that it is of a form that has been tentatively referred to *Z. latifolia* but which will have to find another name, since it is very distinct from typical *Z. latifolia* (Hook.) Greene.

Thus ended a very interesting, if rather strenous, trip. To enumerate all the plants seen would require too much space, so only some of the most noticable have been mentioned. It may be noticed that few "common names" are given. Many of our California wild-flowers have not yet entered enough into the life of the people to be blessed with names other than those bestowed upon them by botanists.

ROCKY MOUNTAIN PLANT NAMES

By Mrs. M. E. Soth

NATURALLY many plants of the Ranunculus family as well as of others are called "western" because they differ only slightly from similar plants of eastern range. Western virgin's bower (*Clematis ligusticifolia*), western anemone (*Anemone occidentalis*) and western columbine (*Aquilegia formosa*) are familiar examples. Thus, too, "wild" was an easy way to distinguish some indigenous plants from introduced species similar in appearance or characteristics. Introduced species like *Ranunculus acris* and *R. repens* have retained their well-known names as have those familiar often homely forms that are transcontinental in habitat. Round-fruited, long-leaved, small-flowered and others are mostly literal translations of their Latin names and one has but to consult the manuals to find them.

There, are, however, a few distinctive names that designate certain Rocky Mountain members of the Ranunculaceae. *Delphinium Geyeri* is "poisonweed", or "poison larkspur," because the large tuft of root leaves, springing up before other forage grows, is often eaten by stock with fatal results. Larkspur is also called "rabbit-ears" by many school children, the name being of generic application.

Aquilegia coerulea, being the State flower of Colorado is quite generally called "Colorado columbine" while *A. chrysantha* is golden columbine as its name indicates. Our mountain species of *Caltha* bears the distinctive name of "elkslip," the *Thalictrum* is fittingly dubbed "maid-of-the-mist" and my own children call the little creeping crowfoot, *Ranunculus cymbalaria,* "ghi plant" meaning melted butter, a name which they themselves adapted from the tale of little black Sambo.

The Westerners, as a rule, prefer to divide the genus *Clematis* into three parts. We call the small white-flowered varieties, "wild or white clematis," "traveller's joy or "pipe stem." The upright herbs of the *Viorna* type are known variously as "leather flower," "vase-vine," "headache weed," or (in fruit)," lion's beard" or "old man's whiskers." The vines with large purple-sepalled flowers are called "bell-rue" or "purple virgin's bower," sometimes "western virgin's bower."

ADDITIONAL NOTES ON PLANT NAMES

THE further one delves into the subject of vernacular names, the more he is impressed with the uncertainty that underlies much of the subject. One would think that if the derivation of a plant name is known at all, there ought to be something definite about it, but this is far from the case. Two or three derivations are often met with, any one of which would meet the requirements by itself, but coming several together they offer a fine exercise in careful discrimination. Something of this nature is connected with the name of "knout berry" applied to *Rubus chamaemorus.* Professor J. C. Nelson writes that the recognized derivation is from Canute or Cnut and really means "Canute-berry" after an early English king. It has also been suggested that the name was derived from a whip of the same name, popular in Russia, which was constructed of leather thongs into which bits of iron were twisted to make it more efficacious. The first derivation is regarded as having the weight of authority but one wonders how the monarch became connected with the berry. One tradition has it that King Canute was once saved from starvation by eating the fruits of this species. The fact must not be overlooked in this connection, however, that in the north of England, knot means a hill and it is quite possible that the name may have been given the plant for its habit of growing in elevated places. According to Prior the knotty joints of the stems of this plant gave it its common name.

Among the names applied to *Trillium sessile* and *T. recurvatum* we failed to include "beefsteak" which is commonly used in parts of Illinois. The reference is of course to the dull red flowers not unlike raw beef in color. The name of "true-love" applied to *T. erectum* is explained when it becomes known that this name was long ago applied to *Paris quadrifolia* of Europe because the four leaves are arranged "in the form of a true-love knot." *Paris* being a member of the Trilliaceae, some ancient chronicler simply transferred the name to a species with three leaves, to the consequent mystification of later students.

In connection with the notes on the lilies, it may be of interest to know that *Lilium martagon*, the true "turk's cap lily," is regarded by many as the "lily of the field" spoken of in the Bible. It is probably the original also of that hyacinth which is fabled to have sprung from the blood of a youth killed by Apollo.

OWNERS OF COMPLETE SETS

The list of owners of complete sets of *American Botanist* recently published in this magazine, indicates that full sets are not as common as we had imagined. Often a missing volume or even a single missing number keeps a set from being complete. Since we have not a single extra copy of several volumes, it is certain that many sets must remain incomplete unless the desired numbers can be picked up elsewhere. There are now less than 25 sets offered for sale and only 11 more that are complete from volume 1 to volume 22. When the World War began, we endeavored to aid in eliminating waste by reducing our output to cover subscriptions and complete volumes, only. In consequence we have not an odd number of any volume later than 1914. In the past year we have had to refuse many who asked to begin their subscriptions with some of these late volumes. Eleven persons who have sets of the magazine beginning with volume 23 can still fill these sets by ordering the early volumes at $12 for the set, but there are only 11 opportunities of this kind left. We have also a very few sets of volumes earlier than 1914 of which we shall be glad to quote prices upon application. We print on another page a list of the names of those who have notified us that they possess complete sets, or who have purchased sets since the first list was published. The State College of Pullman, Washington, lacks only the number for August 1920. Any reader who can spare this number will confer a favor on the college by forwarding it. Possession of a complete set of this magazine is now certain to become a mark of distinction.

NOTE *and* COMMENT

Valuable Ferns.—Nowadays it is customary for the florist to include with every order of cut flowers one or more fern leaves and we accept this added greenery without a thought as to its source. Doubtless a good many people suppose that the florist grows it as he does the rest of his stock, but the truth is the leaves are collected from living plants growing wild in our nothern forests. Since the demand for fern leaves is constantly growing, it is evident that certain species of ferns will become rare unless the greatest care is taken to collect the leaves without harming the plants. Ferns are not a product of the soil itself and can no more thrive without their leaves than could an animal deprived of its digestive organs. If the leaves are collected late in the year and care is taken to leave the root-stock uninjured, it is likely that little harm will result, but if collectors are allowed to uproot the plants and tear off the leaves there will soon be no ferns to collect. Some idea of the proportions to which the trade in fern leaves has grown may be had from an item in *Horticulture* which mentions that a single company has recently constructed in North Adams, Mass., a storage house for ferns costing $40,000 and capable of storing forty-two million fern fronds. The ferns commonly used are forms of the spinulose shield fern (*Nephrodium spinulosum*), though others are used to some extent, notably those of the Christmas fern (*Polystichum acrostichoides*) which are known to the trade as dagger ferns.

COMMON NAMES FROM SURNAMES.—Prof. J. C. Nelson makes a further addition to the list of common names derived from surnames which was published in the August issue. This is "Johnson grass" (*Holcus halapensis*) which has some value as a forage plant and is grown in the South though it oftens proves a nuisance because of its running rootstocks which makes it difficult to eradicate it from a piece of ground when once it has become established. The grass was named after a certain W. Johnson of Alabama who seems to have introduced it into his State between 1840 and 1845. Little seems to be known about this particular Johnson. Possibly he may have come to shun publicity and to regard his namesake with aversion since it threatened him with notoriety instead of fame.

FRUITS OF THE FLOWERING QUINCE.—It is probably unnecessary to observe that all quinces produce flowers though that scarlet-flowered shrub of early spring often bears the name given it in our title. It is more properly the Japan quince (*Cydonia Japonica*). It is probably called "flowering quince" to distinguish it from the garden species which though a beautiful sight when covered with its pink rose-like flowers, is seldom grown for ornament. The flowering quince has still another claim to its title from the fact that it seldom bears fruit. Many people imagine that it never does so. As proof that it may fruit on occasion we have a fine specimen more than eight inches in circumference, and therefore approximating the fruit of the garden quince in size, which was sent by Mrs. O. A. Runyon, Cattellsville, Kentucky. Mrs. Runyon writes that last spring a shrub of *Cydonia Japonica* in her grounds was thickly set with fruit but that a late frost caused all but four to drop from the plant. Those that remained matured October 12th. The fruit is a clear yellow-brown and not greenish-yellow as Bailey's "Cyclopedia" describes it. No reason has ever been advanced to account for the lack of fruit on this species, but the reason may possibly be found in the sensitiveness of its carpels to frost. Although it blooms early, its fruiting parts may not be entirely hardy. There is still another species of *Cydonia* cultivated in the South that is not certainly hardy north of the Ohio Valley. The fruits of all quinces are edible and may be used for jellies and marmelades. As a matter fact, there is no true marmelade that is not made from quinces for the word marmelade itself comes from *marmelo* the French word for quince!

Starting Fern Spores.—Fern spores, as everybody knows are producted in great abundance and yet new fern plants are not usually numerous. There are many vicissitudes in the life of a sporeling and few come to maturity. The spores are so exceedingly minute and the conditions for growth are necessarily so exacting that young plants are easily discouraged. Those who grow ferns from spores find that great care must be taken in preparing the soil. Usually it is sterilized by baking and even then other low forms of life may overrun the young plants before they fairly get started in the world. Often the spores are sown on a block of peat which is kept moist and sheltered from the sun and wind. Noticing how frequently sporelings are found on the outside of the flowerpots in the greenhouse, some growers stop up the hole in the bottom of a pot, fill the pot with water and sow the spores on the outside. The water seeps through just fast enough to give the proper amount of moisture. An improvement on this method is to hollow out one side of a soft brick and fill the hollow with sterile soil upon which the spores are sown. The brick is then placed in a saucer of water and "kept close," as the grower phrases it. This method of growing plants may also be followed in the case if minute seeds which are difficult to start in ordinary seed pans or flats.

HAWTHORN VS. THORNAPPLE.—Dr. J. W. Peroutky, Merrill, Wis. writes that throughout northern Wisconsin he has never heard the name of haw or hawthorn used for species of *Crataegus*. It is invariably thornapple. It might be interesting to know how frequently the other claimant to the title of thornapple, *Datura stramonium,* is called by this name. The plant has several names but Jimson weed is the only name we have ever heard actually used in conversation.

PRAIRIE GENTIAN.—While some rare wildflowers are comparatively easy to colonize under ordinary garden conditions, others are very difficult and often utterly refuse to do well until all their wants are complied with. This is the case with the Pairie gentian as well as other choice members of the Gentian family. Whether grown from seed or transplanted, if placed in the open bed the chances are that it will be lifted out of the ground by the freezing in winter. On the prairie or in the meadow surrounded by a network of grass roots holding it down, it winters safely. The plant is commonly known as alkali lily and prairie gentian. It is a beautiful plant wherever grown but its full splendor is reached only when growing in masses in alkali soil. It is common, there, to find twenty or more long-stemmed flowers on one stalk and rarely plants are found bearing flowers of shimering translucent gold, or with snow-white blossoms. A glance at the root system of a plant in full bloom should be sufficient to give the reason for its extra care in cultivation. One plant, bearing more flowers than one would care to place in a single vase at one time, will be found growing from a root much smaller in size than any ordinary plant.—*Mrs. S. B. Walker, Denver, Colorado.*

Surnames from Plants.—The list of surnames derived from plants appears to be much longer than might be inferred from the list in a recent number of this magazine. We are indebted to Rev. George H. Tilton, Melrose, Mass. for a considerable list of additions and others have been supplied by Miss Adella Prescott, New Hartford, N. Y. The additional names, alphabetically arranged are given here. It may be well to caution our readers against a too ready acceptance of some of them. Similarity of sound is not a safe indication of derivation in all cases and it is practically certain that several of these names have no connection with plants. It would often require much research to prove this, while the origin of others may be more easily known. This is the list: Abele, Alders, Almon, Anise, Aster, Avelin, Aven, Basil, Bay, Bean, Beech, Birch, Blight, Branch, Bramble, Brier, Brush, Brumel, Bush, Burnett, Burrage, Campion, Capers, Cedar, Cherry, Clary, Clover, Comfrey, Cornel, Coffey, Cotton, Cress, Cudworth, Currant, Daisy, Dill, Elder, Elms, Fennell, Flagg, Flaxman, Furze, Garlic, Gourd, Greenwood, Hay, Hazel, Hedge, Holly, Holm, Ivy, Kale, Kane, Knott, Lemon, Lichin, Linn, Linden, Ling, Lupien, Mallowes, Manna, Maple, Millet, Mullen, Nettles, Nutt, Olive, Onion, Peach, Pear, Pease, Pepper, Pink, Plum, Planten, Poppe, Savory, Sprout, Sycamore, Tansey, Thistle, Thym, Towe, Tree, Twigg, Vine, Violette, Weed, Wickens.

A Long Time Without Winding.—Most people have the impression that the common four-o'clock (*Mirabilis jalapa*) of our gardens is an annual but this is a mistake. The plant is a perennial in its native haunts and in less favorable latitudes will show its true nature if dug up and protected from the cold of winter. Some plants of this species in the writer's possession are at least seven years old and as thrifty as ever, single plants spreading over a circle nearly six feet in diameter. A remarkable instance of the tenacity with which this species clings to life was found in one plant which was overlooked in the spring of 1920 and which did not get back into the ground again until May 1921. After nineteen months without soil or water it grew promptly and has since flowered profusely. A further proof of the hardiness of the four-o'clock is found in the fact that some plants left out in the ground without protection during the recent mild winter, came through unharmed in the latitude of Chicago.

TRIBULUS BECOMES A TRIBULATION.—In the days when knighthood was in blossom, some ingenious blacksmith invented a devilish instrument called a caltrop which consisted of four spikes so arranged that no matter in what position placed, one of them projected upward. When things looked darker than usual for the knights, they often saved their hardware by strewing their retreat with caltrops. These penetrating the feet of their foe's horses effectually held them in check. As in so many cases, however, nature seems to have thought of the scheme first for the species of *Tribulus* are equipped with fruits that are pretty good likenesses to caltrops. The plants are originally from Europe but they have escaped to America and thrive especially in our West where they strew the ground in just the right position to interfere with the automobile traffic. According to the United States Department of Agriculture, they produce as effective punctures as ever a man-made caltrop did. The plants lie flat on the ground and are not easily eradicated by the usual means. Tourists call the plant "devil's bur", "puncture vine" and "automobile weed." It was formerly known as "ground-bur."

PLANT HAIRS OF HONEY LOCUST.—W. B. McDougal has found that root-hairs of honey locust (*Gleditsia triacanthos*) and various other related species are not as evanescent as these structures usually are. Almost as soon as produced they are reported to develop thick walls and remain on the plant as long as does the epidermis from which they grow. It is suggested that such thick-walled root-hairs are xerophytic structures and indicate that the plants equipped with them are adapted to life in dry regions. Whatever their cause they evidently prevent the entrance of parasitic or symbiotic fungi and so such trees have neither mycorhizas nor bacterial nodules such as most other Leguminosae possess.

MAIDEN HAIR TREE.—Permit me to offer a slight correction in an article in your last number (p. 23) concerning *Ginkgo.* The union of sperm and egg takes place about Sept 1, at Tokio according to Hirase's original paper, and at the same time at Philadelphia where I have followed the process. At this time the seeds are still on the tree. Ikeno later showed that this stage occurs on the tree, before the seeds fall. The embryos mature about Nov. 1 at Tokio and at Philadelphia. Hirase says that the seeds may or may not fall before this time. At Philadelphia they had fallen. Does any body use the name "maiden hair fern tree?" We are accustomed to the name "maiden hair tree."—*Prof. Henry S. Conard, Grinnell, Iowa.* ["Maiden hair tree" is probably more commonly used than "maiden hair Fern Tree," and yet it is apparent that the latter is the proper name. This tree is so named because it is like the maiden hair fern, not like a maiden hair! The fern is so named because the black roots, like hair, were supposed, according to the "doctrine of signatures," to be good for falling hair and the plant was actually used in "syrup of capillaire." Common names, however, are not based on logic or authority; they are the names commonly used; therefore this tree seems to be the Maiden hair tree.—ED.].

LONG RANGE WEATHER PREDICTIONS:—When an English scientist announces that it will be warm in Cairo, Egypt, tomorrow since it is cold in London, today and that the rainfall will be unusually heavy in England this winter since it was unusually light in Cuba last summer; when another says that a light rainfall in Chile during the period from May to August will be followed during July to October by more than ordinary floods on the Nile; when a Japanese mathematician says that the rice crop in northern Japan will be large this fall since the barometer was unusually high last spring over China; when the scientists begin making long-range and curiously disconnected forecasts as these, it would seem that they are beginning to understand something of how this complicated atmosphere of ours works. * * * * Many such correspondences between weather happenings in widely separated parts of the world have been shown. The rainfall of the central United States shows a direct correspondence to that of central South America and both show an inverse relation to the rainfall of Australia. A forecast of temperature at Berlin in March and April is possible at the end of December from the temperature of Christinia, Norway. When the April temperature at Irkutsk, Siberia, is higher than the normal. we may expect with a high degree of probability that the temperature of San Francisco in the following July will be abnormally low and conversely. The higher the barometric pressure in the Argentine and Chile during March and April, the greater will be the Monsoon rainfall of India the following July and August.—*Thomas A. Blair in Scientific Monthly.*

THE INDUSTRIOUS ANT.—Travellers through our Southwest cannot have failed to notice the over-sized ant-hills scattered liberally over the plains. The casual observer notes the cone-shaped hills like small volcanoes, each surrounded by a wide circle of cleared ground, but unless he carefully examines them, he may fail to discover that the ants are not content merely to build up symmetrical hills; they finish the job by covering the exterior with more or less ornamental material. Sometimes this consists of the fat, cylindrical leaves of the greasewood, or the berries from the one-seeded juniper, or of small stones. To obtain these ornaments, the ants apparently often travel considerable distances. When new materials are presented, the intelligent insects are not slow to take advantage of them. In the garnet beds of northeastern Arizona, the ant hills are literally covered with garnets, a fact well known to the Navajo, who secures his supplies by robbing the ants. In Laguna Canyon, also in Arizona, a still different variety of ornament was seen. Here a hill was entirely covered with the shells of small water snails, though located in a most arid spot. It seems the canyon once contained a lake with the usual complement of animal life, and the snail shells were left in a layer of peat some distance below the surface. The ants in their tunneling had evidently reached this layer and utilized the shells in place of more common material. The writer tried to make the conchologist of the party believe the shells represented an ant's kitchen midden, but without much success.

Winkling Mary-Buds.—Referring to the quotation from *The American Botanist* in the January issue as to whether Shakespeare's "Winking Mary-buds" meant marigold or Buttercup, it would appear that the writer overlooked the Corn Marigold, which in some parts of Shakespear's country is as common as the Corn Poppy; this is known as *Chrysanthemum segetum*, which has a variety equally common, separated in some works as *grandiflorum*, and which has flowers as large as the *Calendula*. I venture to suggest that if Shakespeare meant marigold at all it would be the above rather than *Caltha palustris.—Arthur Smith in Gardeners' Chronicle*

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EDITORIAL

Beginning with the next number this magazine is to be enlarged again. As usual the increase in size will not affect the price; we shall simply give our readers more for their money. In veiw of this fact, we trust that every subscriber on our lists will renew promptly and that they will actively co-operate with us in extending the influence of the magazine. The size of the publication from year to year is largely in the hands of its subscribers. Any marked increase in its patronage is very soon reflected in an increased number of pages. It is very certain that if our subscription list should double, the size of the magazine would double also. When you mention this magazine to others, therefore, you are promoting your own interests. In the past the publication has been cordially supported and we trust that this support will continue.

* * *

Students of plants have missed much if they have not had access to Wood's "Class-Book of Botany." Wood was not a technicist; he made few attempts to seggregate or describe new species, and his name is seldom mentioned when the leaders of his chosen science are enumerated; but he was a botanist in the best sense of that term and the spirit that pervades his work has endeared him to students of plants as the more technical Manuals of Gray and Britton never will. In studying the "Class-Book" one is impressed with the author's love for his specimens and his desire to interest others in them. Modern Manuals are models of efficiency; they produce the name of an unknown plant in the most direct way and describe every species in the most concise and accurate terms; but not infrequently a cold technical account of a species fails to give one a clear impression of it. One would scarcely recognize his friends if described in a similar way. It is at this point that Wood excels all others. His technical descriptions are models of brevity but after the technical details have been set down, the botanist merges into the plant lover and then he adds a sentence or two in our own tongue that so aptly characterizes the plant that the last lingering doubt disappears. It is this personal touch that gives life to his descriptions. Of the rue anemone, he says, "A fine little plant of early spring. Root consisting of several oblong tubers." Of hepatica, "This little plant is one of the earlist harbingers of spring, often putting forth its neat and elegant flowers in the neighborhood of some snowbank." His observations on a common violet indicates that he was familiar with the variations that later writers have seized upon for the segregation of species for he says of *Viola Cucullata* "This varies from pubescent to glabrous, from leaves reniforn to ovate, deltoid, or hastate, from flowers deep blue to light blue or even white and, as now generally conceded, to the following remarkable forms" of which he describes two. He says of the sundew "A curious little plant not uncommon in bogs and on muddy shores. Whole plant of a reddish hue like other sundews and beset with glandular hairs which are usually tipped with a drop of clammy fluid glistening like dew in the sun." Of the closed gentian he writes "Flowers inflated, so nearly inclosed at the top as to be readily taken for buds and the young botanist waits in vain to see them expand." And so he passes from species to species with observations that show his deep love for the study. Unfortunately the "Class-Book" has long been out of print. The age in which it was published—an age in which there was time for leisurely rambles afield—has given way to an age of automobiles, telephones, air ships, wireless and other means of annihilating time and distance. The world now moves too rapidly for the "Class-Book", but looking through the yellowing leaves of our own copy we are disposed to think that something precious was lost when it ceased to represent the attitude of the student toward the plant world.

BOOKS AND WRITERS

In recent years a number of facts have accumulated which indicates that protoplasm—that stuff of which living tissue is made—may itself have its youth, maturity and old age. It is well known, that seedling peonies and pyrethrums may produce single flowers at first and only become double with age. Fresh seeds of cucurbits commonly produce plants with a great amount of leaf and stem, but the same seeds allowed to age before planting will produce a much greater number of fruits. Plants tranferred to our gardens from the wild are often difficult to raise from seeds but when they are once grown in that way, further crops of plants from seeds are more easily obtained. A plant which roots with difficulty from cuttings takes readily to this method of propagation after a succession of cuttings has been established. The evidence from the animal side is fully as striking. Although the scientists are inclined to scout the inherittance of acquired characteristics, there are many reasons to believe that they are wrong. Certainly modern forms exhibit characters that their remote ancestors did not possess. If these characters were not acquired at some stage in the history of the family line and since inherited, it is incumbent upon the scientists to explain where they did come from. The fact that mutilations deliberately made upon plants or animals are not inherited proves nothing. It is not likely that useless or harmful characters would be likely to be inherited. It is upon facts such as these that Casper L. Redfield has based a little book on "Human Heredity". In it he contends that any theory of eugenics founded on the Darwinian theory is wrong. His own theory is that the inherent power in an animal increases as it is excerised and decreases as it is neglected. Granting this, it is easy to see that the greatest improvements must come from the descendants of the older and more experienced individuals. An individual cannot inherit something its parents did not possess, hence, applying these principals to the human race, the authur finds that the older the parents at the time of birth, the likelier the children. will be to become eminent. This proposition is backed up by an imposing amount of evidence drawn from the geneology of eminent men. The book seems to have added something distinctly novel to the subject of eugenics and is well worth a careful reading. It is published by the Heredity Publishing Company, Monadnock Building, Chicago.

Fruit-growing being one of the chief industries of the State of New York, it is fitting that this commonwealth should be foremost in providing information regarding the various forms. To this end a series of sumptuous volumes are being issued under the editorship of Dr. U. P. Heidrick, each of which is devoted to a different group of fruits. In this series have already been published volumes on the apples, grapes, plums, cherries and peaches and a similar volume on the pears is in press. Though designed to describe only the fruits peculiar to the State, the author has wisely included all other known forms that might possibly grow in the area and thus each volume becomes a pretty complete account of all the varieties of the fruit discussed. In the Plums for instance, there are more than 600 pages of text and nearly a hundred handsome plates, the latter unusually fine examples of color printing. In the text each species is carefully described, its synonomy given, its origin traced, and a considerable amount of additional matter of interest to the horticulturist added. It is difficult for those not actively interested in fruit growing to realize the great variety of forms that have been developed. As regards the peach the author mentions smooth-skinned and pubescent sorts, cling-stones and free-stones, yellow-fleshed, red-fleshed and white-fleshed varieties, and round, flat, nippled, cleft and beaked fruits. Added to these are white, pink and red-flowered forms, double and semi-double sorts, trees with two colors of flowers, pyramidal and weeping trees, and trees with red or brownish foliage. One of the curious forms illustrated is the peento peach from China with flat fruits only an inch long and twice as wide. In the volume on the cherries the author reverses the old idea that the generic name for these fruits (*Cerasus*) is derived from a town in Asia Minor of similar name. He states that *Cerasus* is a very ancient name for the cherry and that the town was named for the fruit. Our peaches seem to have been derived either from a single species or a group of closely related forms, the cherries may have four species in their ancestry but nearly a dozen species have given us our plums. The compilation and arrangement of the immense amount of matter included in the text reflects great credit upon the author, and the entire undertaking is especially pleasing to this magazine which originated in New York State and which is still interested in its progress.

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